

Evaluating Job Cost Information
(Cost Control Series) page 53

July, 1961

ROADS^{AND}STREETS

A GILLETTE PUBLICATION



UNIVERSITY MICROFILMS
EUGENE B. POWER
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ANN ARBOR, MICH.
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4

4 WAYS TO BETTER PAVING PROFITS



1. JACKSON VIBRATORY COMPACTOR. On any major paving project involving the compaction of granular soils, from sand to large rock, or soil-cement mixes the JACKSON MULTIPLE VIBRATOR COMPACTOR will save its cost in jig time. It's faster in attaining 100% of specified density, more economical to operate and maintain, and has far greater job adaptability than any other machine. Each of the 6 compactor units delivers 4200 3-TON BLOWS PER MINUTE. The 4 outer units can be instantly raised for road travel or greater maneuverability around other equipment. Each compactor unit can be detached, fitted with operating handle and used as a self-propelling compactor to get into places other equipment can't reach. With side towing device no other equipment can rival it on widening operations.

2. MUNICIPAL PAVING. For jobs of this type a JACKSON VIBRATORY SCREED and Portable Power Plant is a very convenient, productive and inexpensive outfit. Strikes off to any crown, undercuts at curbs and sideforms, works right up to and around all obstructions. Two men easily handle it on all slabs up to 30 ft. wide. Rolls back for second passes on 4 rollers.

3. JACKSON SURFACE TYPE PAVING TUBE. Equipped with very powerful vibratory motors, tremendous energy is imparted to the freshly spread concrete, puddling thoroughly even the harsh and dry mixes. The tubular bases can be supplied in the exact width to fit the job. Attaches to Spreader or Finisher.

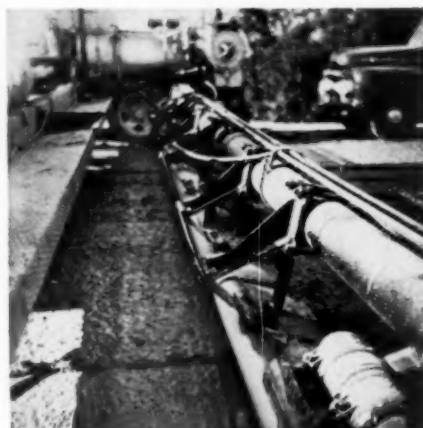
4. JACKSON ENGINE-DRIVEN COMPACTOR. Most powerful and reliable machine of its type on the market. Delivers 4200 3-TON BLOWS per minute. 7 H.P. Wisconsin engine almost completely isolated from vibration. Adjustable vibration-free handle. Wetting device to prevent sticking of asphalt. Instantly attachable wheels for easy movement from location to location (extra). Also available with powerful single phase, 110-120 V. electric motor.

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Name and literature on request.

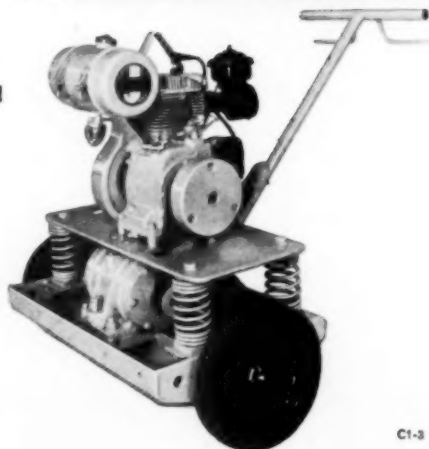
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LUDINGTON, MICHIGAN

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C1-3



PILE ON THE FILL — it's corrugated galvanized steel culvert

This rugged, heavy fill—43 feet of it—poses no problem for the 42-in. culvert made from 8-gage Beth-Cu-Loy galvanized corrugated steel sheets. That's because a culvert made of Beth-Cu-Loy is strong yet flexible enough to deflect with the fill, thus tending to equalize the load peripherally.

Flexibility also permits corrugated galvanized steel pipe to take the impact and vibration of heavy traffic. Corrugated steel withstands sharp weather changes and settling fills. It simplifies grading and alignment, and is easy to install without need for heavy equipment.

Beth-Cu-Loy sheets conform to the rigid specs of the AASHO. Rolled from open-hearth steel, these sheets contain copper for extra corrosion resistance. They are galvanized in Bethlehem's modern facilities with a 2-oz triple-spot test coating of Prime Western zinc. Your fabricator will be glad to give you complete details.



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... Versatility

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HIGHWAYS • BRIDGES • AIR FIELDS • HEAVY CONSTRUCTION

Industry Affairs	19 Washington Newsletter
	58 "Highway Week"
Contractor Management,	50 Dune Sand Was the Villain
Equipment Utilization,	53 Approaches for Evaluating Cost Information
Job Methods	54 Good "Up-Front" Control Marked This Paving Job
	64 Floating Hollow Pier Footings Cut Bridge Job Cost
	77 Continued Education for Ohio's Contractors
Engineering, Technical,	82 Getting Down to Details on Job Quality Control
Maintenance	88 High Strength Steels Now Come in Shapes
	91 Windproof Sings, Better Highway Hardware
	100 New Mexico Tests "Upside Down" Designs
	102 The Familiar Asphalt Kettle Goes Automatic
	104 Airfield Apron Sealed Against Jet Fuel
Departments	34 People
	42 New Publications
	49 Editorial (Good Contractors an Asset in British Road Program)
	72 Labor
	81 Traffic Safety
	110 Views and Comments by H. G. Nevitt
Where to Buy It	130 Reader Inquiry Card
	132 New Products
	161 Manufacturers' Literature
	149 Clearing House (Used Equipment Advertising)
	162 Advertisers' Index

FRONT COVER SCENE

Holloway Construction Company's 7.8-mile, \$3.6-million grading project on I-94 through the dune country below St. Joseph, Michigan. Shown is a Michigan 280 wheeled tractor on the job. (See story on page 50)



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Why not get the full story on the performance and savings that make the Super Road Lug your best bet for big jobs — and details on Goodyear Contractor Service — *before* your next bid. Just call your Goodyear dealer — or write Goodyear, Truck Tire Department, Akron 16, Ohio. Remember, lots of good things come from Goodyear.



Road Lug — T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

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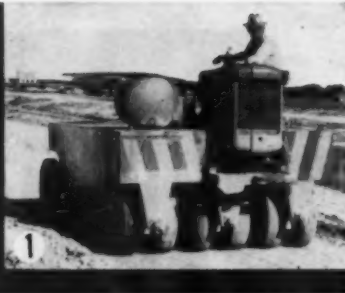
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MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

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ROADS AND STREETS, July, 1961

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go BMCO ...



During 1961, more and more contractors, nationwide, have turned to BMCO for the most versatile, most dependable and most complete lines of compaction equipment available ... anywhere. As it has them, it will pay you to investigate BMCO before you invest in any compaction equipment.

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Export Office: P. O. Box 1051, Denver, Colorado



- 1 M. B. Killian and Jack House; partners, Killian-House Co., cut compaction time in half with BMCO SPR-13's on the Interstate Highway 35 expressway in San Antonio, Texas.
- 2 V. P. Stewart; vice president and general manager, San Xavier Rock and Sand Co.; tried out numerous compactors before choosing BMCO SPR-13's for the Route 84 Freeway in Tucson, Arizona.
- 3 John E. Tiger; Griffith Company superintendent, Los Angeles; solved a tough compaction problem in fine content soil with a BMCO 25T11 on the LeMoore Naval Station project in Fresno, California.
- 4 Contractor H. D. Gregory used BMCO's SPR-13, self-propelled roller, and HD-114, 60" triple-drum sheepfoot roller, to attain 100% compaction on Atlanta, Georgia's Downtown Freeway project.

ROADS AND STREETS

Devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations; the construction and maintenance of airports. Represents 69 years of continuous publishing in the highway field; combined with Engineering and Contracting and Good Roads Magazines, established in 1892.

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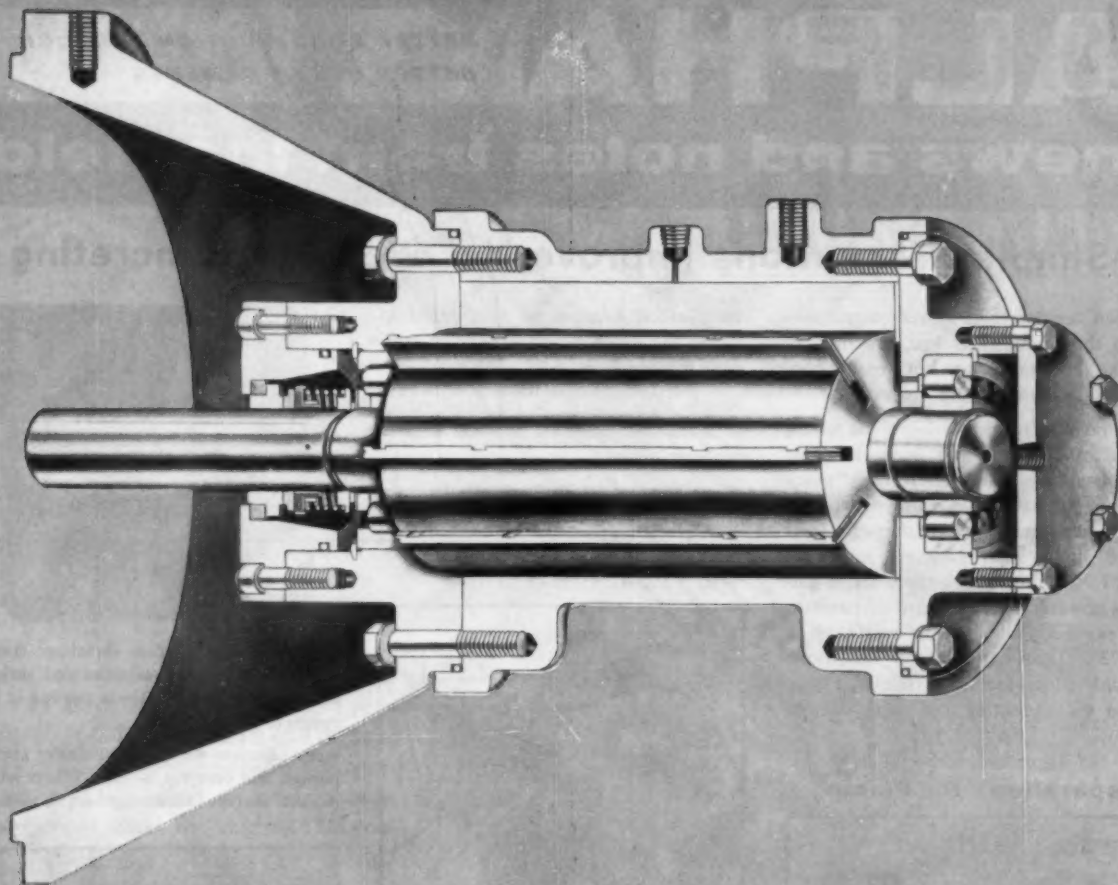
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NEW MONO-ROTOR INTRODUCED IN 85', 125' AND 250' MODELS

Now Worthington introduces the new Mono-Rotor Blue Brute compressor—a significant step ahead in improving compressor performance. The Mono-Rotor introduction follows six full years of development and field testing. It can be ordered immediately in the most commonly used sizes.

The major feature of the Mono-Rotor design is its extremely simple, dependable construction. The Mono-Rotor is built with just one stage . . . just one rotor . . . just two bearings . . . no gears . . . oil pump.



NEW 125' MONO-ROTOR COMPRESSOR

It is simpler in construction than any two stage compressor or any screw type compressor. This simple construction is the basis of its high degree of reliability.

How reliable is the Mono-Rotor? Its reliability is so great that Worthington has quadrupled its warranty period. The standard warranty agreement has been extended from the usual 90 days to one full year. Worthington is the first compressor manufacturer supplying the construction industry to do so.

What makes the new Mono-Rotor design so successful? It is the new Worthington-developed rotor-to-cylinder sealing. For over ten years the industry has attempted to solve this problem for larger compressor sizes. Two-stage construction was the solution until Worthington developed new methods of oil distribution within the cylinder. Now an efficient, dependable air supply is available in just one stage—one rotor construction.

The new Worthington Mono-Rotor

units have other benefits, too. They are 20% lighter in weight and are designed for improved towing and tracking. The third wheel is standard equipment for easier handling on the job. There is an engine-saving clutch and many other features.

The Mono-Rotor Blue Brute can now be ordered in the 85', 125' and 250' sizes. See it . . . rent it . . . or buy it at your Worthington dealer listed in the Yellow Pages under "Compressors." Or write Worthington Corporation, Dept. 60-37, Holyoke, Mass. In Canada: Worthington (Canada) Ltd., Brantford, Ontario.



PRODUCTS THAT WORK FOR YOUR PROFIT

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ALPHA

BETTER CONSTRUCTION THROUGH
BETTER USE OF CEMENTS

news and notes from the field

Simple Precautions Improve Hot Weather Concreting

When temperatures hover in the 80's and the humidity is low, it's time to make sure that certain hot weather concreting precautions are observed.

High temperatures accelerate the setting time of concrete and promote rapid evaporation of water. The result is "quick set" or premature hardening which may cause permanent strength damage. Tests have shown that concrete mixed at 100°F. requires about three more gallons of water per cubic yard to maintain the same consistency as concrete mixed at 73°F. You can see how this alone would reduce the strength of the concrete by increasing the water-cement ratio.

Preparations for Placing



Thoroughly soak the subgrade the night before, and sprinkle it just before the concrete is placed so it will not absorb water from the concrete. The mix should be discharged as soon as it is delivered to the job site. Prolonged mixing should

be avoided because of heat build-up inside the drum which raises the concrete temperature.

Ample help should be on hand ready to handle the concrete as soon as it is properly mixed.

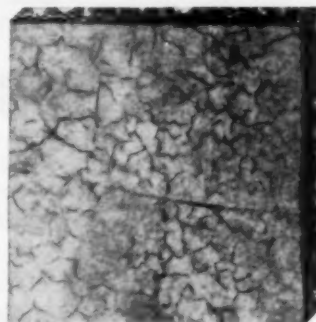
Avoid the use of strength accelerators in hot weather.

Finishing and Curing



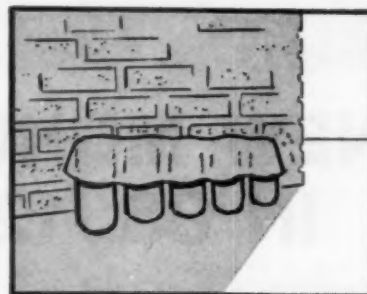
Under extreme conditions in hot weather it may be necessary to shade concrete or use wet coverings until final finishing can be completed.

To counteract the effect of hot, dry breezes, erect wind breaks or use fog nozzles on upwind side of fresh concrete. Start curing operations as soon as concrete has sufficient set to avoid surface damage. When curing is delayed, surface is apt to dry and shrink more rapidly than the lower portion of the concrete slab. This causes crazing or shrinkage cracks.



Crazing cracks. Surface shrinkage cracks result when the surface dries and shrinks more rapidly than the lower portion of the concrete slab.

Keep concrete damp during entire curing period, and cure for at least 7 days when durable surface and strength are important.



Concrete test cylinders should be kept shaded, damp and at 70°F. until they are ready to be sent to the laboratory.

If you would like additional copies of this information, ask your Alpha sales representative or write to Alpha Portland Cement Company, Easton, Pa.

ALPHA

PORTLAND CEMENT COMPANY

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ANNOUNCES A NEW CONCEPT IN TRUCK CRANES

TYPES

250-T 25 ton	300-T 30 ton	350-T 35 ton	450-T 45 ton
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Completely new from the ground up, Lima's modern, low silhouette, Types 250-T, 300-T, 350-T and 450-T have been designed and engineered for one purpose only—to perform as top-production truck cranes under the toughest field conditions. On-the-job studies have proved the need for Lima's new concept.



6127

Check the following profit-making features:

- Perfectly balanced to handle long booms easily, safely. Lifts long booms from the horizontal without assistance.
- Optimum weight distribution for highway travel with a minimum of disassembly.
- Easily stripped for weight limitations—counterweight and both outrigger boxes easily removed.
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- 170' to 180' booms plus jibs, 100,000 psi yield strength steel, tubular construction.
- Exceptionally wide and deep boom cross sections.
- Telescopic safety boom stop, with automatic safety shut off to boom hoist.
- Rotating assembly through in-line shaft design achieves a lower center of gravity, producing greater stability for low boom operation. Exceptional drum cable capacity.
- Unit construction—rotating base, rear end unit and machinery side frames form one complete welded assembly for added strength and rigidity.
- Integrally designed third hoist drum, optional, utilizes full size clutches and brakes.
- Dual control mechanical and air swing brake—one locks rotating base, the other is used to snub for precision work.
- Telescopic gantry is powered up and down—removes rear counterweight.
- Optional reduction gear unit for reduced machinery and line speeds without loss of power.
- Boom point section folds under for highway travel.
- Full vision cab—360° visibility for safest operation.
- Easily maneuvered on or off the road—travels at highway speeds.

We urge you to get the complete story on Lima's newest approach to the most-for-your-money in Truck Crane productivity, dependability and economy. See your local Lima distributor today or write to us.

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Take 15 minutes on a

Prove New International TD-15 cost-cutting capacity tops the 100 hp class

Advantages in heavy-duty hp and in working speeds give the new TD-15 extra work capacity to cut costs, boost earnings — as compared to competitive rigs. *You can prove it, positively.* Advances in strength, wear-resistance, temperature control, and operating ease mean big gains in component life,

upkeep economy and machine availability to owners of new International TD-15's. *You can prove it, beyond doubt, without risk.* Let your International Construction Equipment Distributor give you the revealing 15-minute new "15" demonstration, now!

Prove new TD-15 capacity dozing heavy materials

Fast, easy new TD-15 shifting saves effort, increases output. Size up the new "15's" six-speed, full-reverse transmission with speeds spaced to use extra power and often work a speed faster than competitive rigs. See how the six speeds forward, six reverse, are arranged for easy short-travel, single-stick shifting. Change forward-reverse direction fast with the "Shuttle-Bar." Check the power-transfer efficiency and operating ease of the new "15's" heat-defying, dry-type sintered metal engine clutch!

Give the new "15" a steady job of bulldozing solid materials! Advances like tapered, anti-friction bearings of greatly increased capacity — heavier shafts and deeper, stronger gear teeth — add thousands of hours to transmission component life. New transmission oil pump circulates and filters lubricant for longer gear life. Measure the added economy of features like the new sintered metal steering clutch discs which outlast previous type even while handling greater torque loads!



***International
Construction
Equipment***

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Ill.
A COMPLETE POWER PACKAGE



New "15" (151 SERIES)



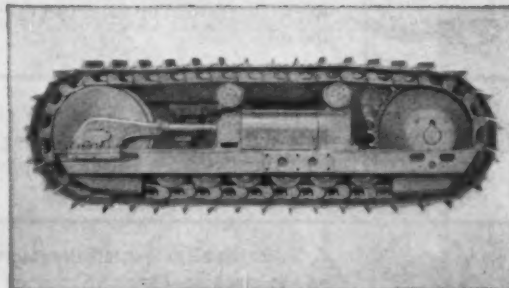
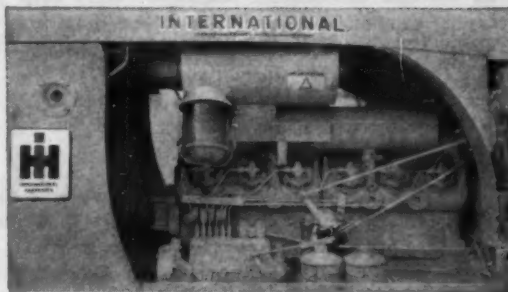
Compare hp and performance protection!

Start the new TD-15's 6-cylinder engine push-button easy — and get the seconds-fast warm-up which only International's famous gasoline-conversion starting provides. Note that *full load* for the new "15" is an overload for other rigs of the 100-hp class. See how the new pressure-type cooling teams with the larger capacity radiator — to give positive temperature control in hottest weather at full capacity 'round the clock.

Look at the "15's" new dry-type air cleaner. It's 99.8% efficient — and 100% convenient! Handy, underhood mounting and transparent, quick-dump collector greatly simplify servicing. International even provides a dash indicator that shows red when element needs servicing!

Prove new "15's" undercarriage strength!

To go along with precision-welded double-box-beam TD-15 track frames is the added strength of drum-type front idlers — the added protection of frame-welded track chain guides — the added service life of self-cleaning, power-saving strutless track links. The new "15" is the only crawler of its power class with the shock-load prevention of ball-joint suspension — basic in International's famous 3-point track mounting design! Improved, high-efficiency full-floating seals protect the long life Dura-Rollers — the track rollers you grease only once per hundred 10-hr. shifts!



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LUBE LOGIC

New tips for

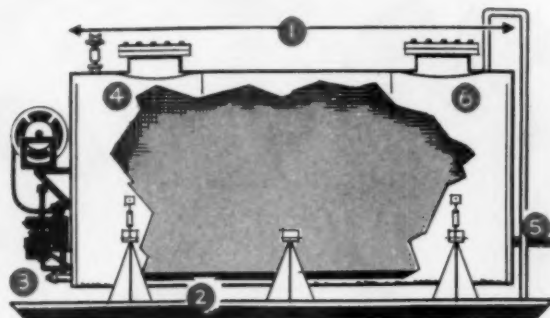
Don't let storage tank contaminate gasoline

One of the basic essentials of good equipment performance is clean fuel; and the best way to make sure the fuel you use is as clean as the fuel you buy is to keep your own storage facilities up to snuff.

What does it take to make the ideal gasoline storage tank? Here are some of the specifics that Texaco engineers have found to be most important.

The ideal gasoline storage tank has:

1. Plenty of room. Every time you fill a tank you stir up the sediment at the bottom. The bigger the tank, the less it has to be refilled, and the longer the sediment stays settled on the bottom.
2. Welded construction.
3. A 1½" drain valve, located at the lowest point.



4. A large hand hole plate or manhole, to make cleaning easier.
5. A suction line to the gasoline pump located several inches above the tank bottom, to avoid drawing out the sediment and condensate.
6. A fine-mesh strainer over the filler opening.

Four tips to keep hydraulic oil clean in storage and handling

Even the best maintenance techniques won't keep your hydraulic equipment on the move if you don't keep the oil clean while it's in storage and while it's being put into the machine. Here are four simple precautions that will assure you of getting nothing but clean, clear oil in the hydraulic system:



1. Store the drums on their sides, indoors if possible, but in any event under some sort of shelter.



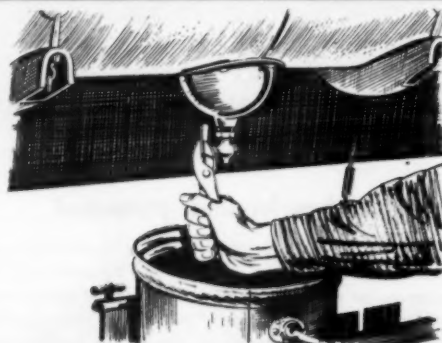
2. Before you open a drum, clean the top so that no dirt or water can fall into the oil.



3. Make sure that you use only *clean* hose and containers in transferring the oil from the drum to the equipment.



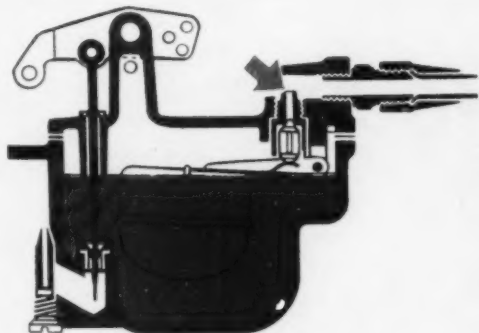
4. Filter the oil as it enters the reservoir on the machine. If the fill pipe on the equipment doesn't have a filter, use a funnel fitted with a 200-mesh screen.



Protect diesel fuel injector with periodic tank drains

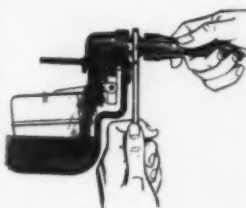
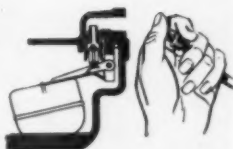
Dirt and water in diesel fuel can ruin a fuel injector in no time. Even if you keep the fuel clean during storage, there's still a good chance that temperature changes will create enough condensation in the fuel tank on your rig to start rusting in the injectors. Several operators have pretty well solved this problem by partially draining the fuel tank once or twice a week. Simply draw off about a gallon of fluid through the drain valve at the bottom of the fuel tank. You lose some fuel this way, but you also get the accumulated water and other contaminants clear out of the fuel system. The cost of the fuel you drain off is a small loss compared to the repair bills you save on the fuel injectors.

more efficient maintenance



Quick cure for carburetor flooding

Repeated stalling and hard restarting is often caused by a tiny particle of grit, which lodges under the carburetor float needle valve, lets too much gasoline into the carburetor and causes flooding. You can often solve the problem with the following routine: disconnect the fuel line at the carburetor and plug it with a cork, a pencil or anything else that will fit. Then run the engine until you've used up all the fuel in the carburetor. Reconnect the fuel line, crank the engine, and the rush of gasoline into the empty carburetor will often flush the foreign matter out of the needle valve seat. If you have a friend but no cork, have the friend start the engine while you plug the disconnected line with your thumb. Same difference.



TEXACO PRESENTS THREE NEW FILMS TO HELP BOOST YOUR PROFITS



1. PLAN FOR PROFIT—Texaco's newest color-and-sound movie. Dramatizes the major savings you can make with the proper investment of less than 1% of your total budget—the amount you spend on lubricants. Film features latest lubrication methods and equipment on a number of contracting projects, demonstrating the Texaco Simplified Lubrication Plan in action.



2. FUNDAMENTALS OF LUBRICATION—a brand new Texaco color slide film. A clear, concise once-over that defines technical terms like "viscosity" and explains specifically what lubrication is and what it does. This down-to-earth discussion will give the lubrication man a new understanding of the importance of lubrication, and a fresh interest in his work. It's supplemented with a manual that covers the same ground in greater detail.



3. LUBRICATION OF EARTHMOVING EQUIPMENT—a new slide film, in color. A concise, easy-to-understand analysis of proper lubrication of engines, wheel bearings, steering, track rollers, crawler treads, hydraulic equipment, wire rope, open and enclosed gears. Supplemented with a manual that covers the whole field of earthmoving equipment lubrication in greater detail.

FOR AN EARLY SHOWING of any one of these films—or all of them—contact your Texaco Contractor Representative *now*.

TEXACO LUBRICATION ENGINEERS

Every month or so we'll bring you a batch of "sleepers," little angles, so easy to overlook, where big savings in money and time can be made. If Lube Logic doesn't solve your problem, call your local Texaco Lubrication Engineer. Anytime, all the time, he's your best source of money-saving lubrication ideas. Don't forget that "Lubrication is a major factor in cost control." Texaco Inc., 135 East 42nd Street, New York 17, N. Y.

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TEXACO

Throughout the United States

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Savings in engine costs alone make the "Euc" C-6 today's best tractor buy


In the Euclid C-6 you get the advantages of job proved power train components... the reliability of the GM 6-71 engine, Allison Torqmatic Drive and Euclid's famous planetary drive... that help keep downtime to a minimum. You get designed-in service accessibility that's unsurpassed by any competitive crawler... servicing or complete removal and replacement time is well below that required for comparable tractors.

You get a big advantage, too, in the lower cost of engine replacement parts... savings that cut your maintenance expense to the absolute minimum. For example, pistons and rings for a competitive engine are 162% higher in cost than for the GM engine; a water pump 243% more; a block 270% more; and replacement of a complete engine, from fan to flywheel, costs almost twice as much in the competitive crawler. These savings, plus faster repair and replacement times, are some of the reasons why owners have found the "Euc" C-6 is the lowest cost tractor in the 200 h.p. class.

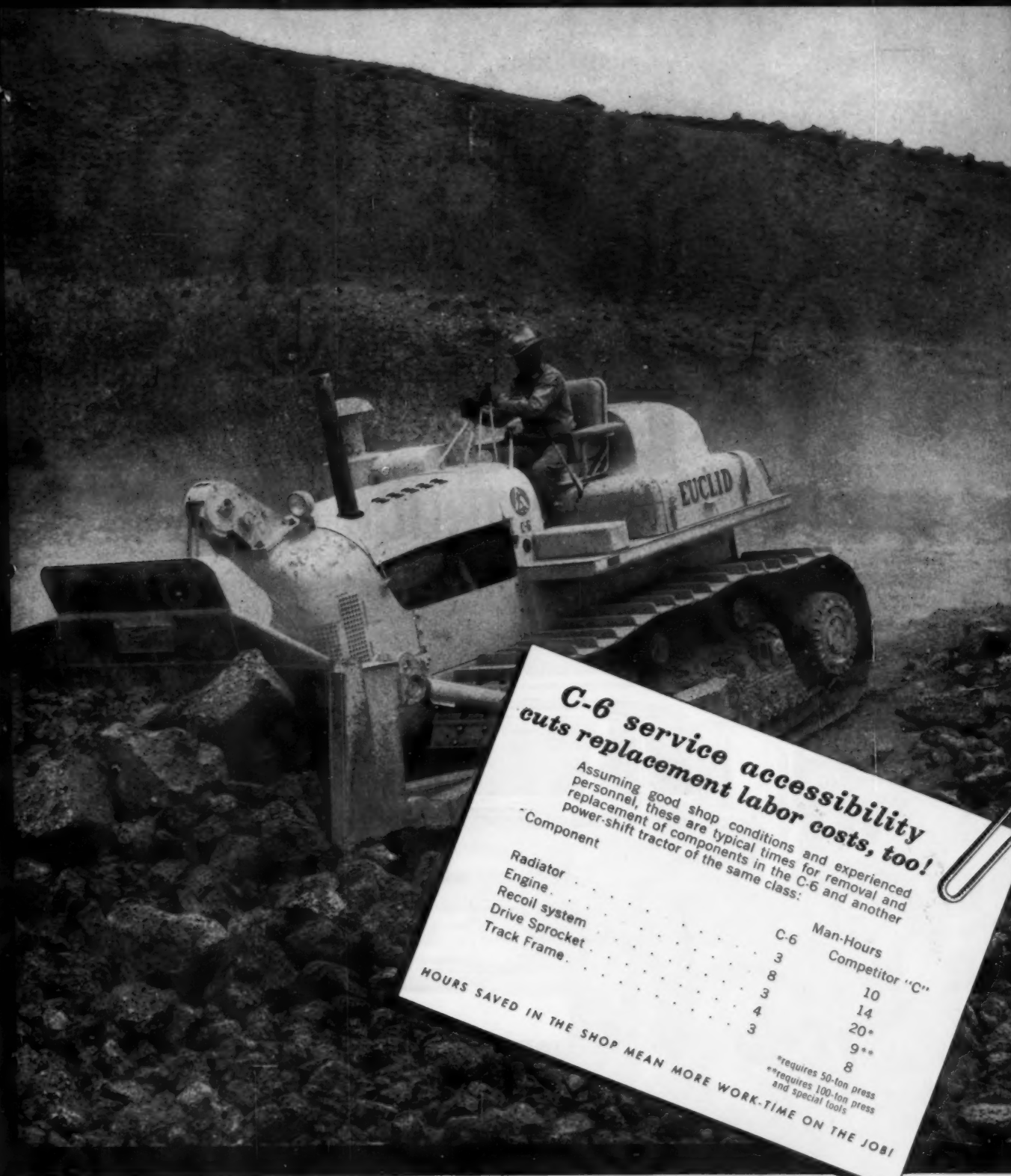
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Plants at Cleveland and Hudson, Ohio
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*Full-power shift... fast-as-a-fox
maneuverability... and greater
over-all work-ability!*



Have your dealer give you all the facts and figures on the C-6... you'll find that in production and maintenance cost this "Euc" gives you a better return on investment.



C-6 service accessibility cuts replacement labor costs, too!

Assuming good shop conditions and experienced personnel, these are typical times for removal and replacement of components in the C-6 and another power-shift tractor of the same class:

Component	C-6	Man-Hours	Competitor "C"
Radiator	3		10
Engine	8		14
Recoil system	3		20*
Drive Sprocket	4		9**
Track Frame	3		8

HOURS SAVED IN THE SHOP MEAN MORE WORK-TIME ON THE JOB!

*requires 50-ton press
**requires 100-ton press
and special tools



EUCLID

DIVISION OF GENERAL MOTORS, HUDSON, OHIO
Plants at Cleveland and Hudson, Ohio and Lanarkshire, Scotland

**THE NEWEST REASON TO MAKE
YOUR NEXT CHASSIS A FORD**

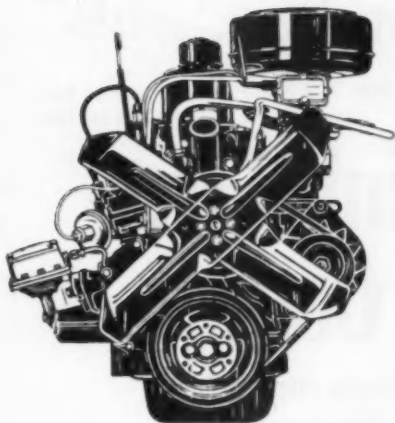
ALL-NEW FORD BIG SIX

262 ^{CU.}IN. TRUCK ENGINE



FORD DIVISION, *Ford Motor Company*,

New F-600 toughness! New stronger frame... huskier cab... rugged truck suspension that can give twice the front tire life of other types!



Now, the economy of a Six is combined with the dependability of heavy-duty, *exclusive-truck* engine design. In independent tests, Ford's new Big Six was pitted against the major competitive Six. Certified* result: Ford Trucks gave 13.5% better gas economy! And Ford recommends 34% fewer service operations in 25,000 miles of customer service. This means less time in the shop . . . more time on the job.

The new Big Six is one of *four* engine choices in Ford F-600 trucks for '61—including America's most popular truck V-8's. See your Ford Dealer. He will be glad to help you select the best engine for your job.

*Tests simulated typical city delivery and shuttle service

SEVEN MORE REASONS

WHY IT'S GOOD BUSINESS TO DO BUSINESS WITH FORD!

You save from the start with Ford's traditionally low prices, and your savings continue with low operating and maintenance costs. These facts are documented by certified test reports from America's foremost independent automotive research firm. Ask to see these reports. They're on file at your Ford Dealer's.

In addition to these dollar-and-cents savings, the following bonus benefits are yours with Ford Trucks:

1. Rigid quality controls give you the strongest safeguard of truck reliability ever. Modern, *exclusive-truck* manufacturing facilities, with emphasis on quality every step of the way, are designed to give you a Ford Truck that is as free from defects as a truck can be. Tangible results of these high standards are Ford's new warranties.

2. Exclusive 100,000-mile warranty (or 24 months) on 401-, 477- and 534-cu. in. Super Duty V-8's is the most liberal in the industry. Each major engine part (including block, heads, crankshaft, valves, pistons, rings), when engine is used in normal service, is warranted by your dealer against defects in material or workmanship for 100,000 miles or 24 months, whichever comes first. The warranty covers full cost of replacement parts . . . full labor costs for first year or 50,000 miles, sliding percentage scale thereafter.

3. 12,000-mile warranty (or 12 months) on all 1961 Ford Trucks of every size is further evidence of the confidence Ford has in its quality controls. Each part, except tires and tubes, is now warranted by your dealer against

defects in material or workmanship for 12 months or 12,000 miles, whichever comes first. The warranty does not apply, of course, to normal maintenance service or to the replacement in normal maintenance of parts such as filters, spark plugs and ignition points.

4. Special fleet financing can be arranged by your Ford Dealer. It's available for owners of two or more trucks, and provides the opportunity to precisely tailor payments to your income patterns or depreciation schedules. This fleet-fitted financing offers substantial savings and frees your working capital.

5. Sales engineers and service specialists in 36 district offices are on call to solve special truck problems. Working with both dealers and customers, these experienced truck men represent another extra step Ford takes to provide your continued satisfaction.

6. Replacement parts depots at 26 strategic locations across the country quickly supply needed parts from ample stocks. Ford's entire supply system is geared to give you faster service and reduce costly downtime . . . wherever you are.

7. 6,800 Ford Dealers, including 280 specialized Heavy Duty truck dealers, can keep your trucks ready to go wherever they go. From coast to coast, fast Ford service—gas and Diesel—is always close at hand.

From Super Economy pickups to Diesel-powered tractors, you can now fill every truck need up to 76,800 pounds GCW with a modern, money-saving Ford Truck.

FORD TRUCKS COST LESS



SEE YOUR FORD DEALER'S "CERTIFIED ECONOMY BOOK" FOR PROOF!

... for more details circle 313 on enclosed return postal card

ROADS AND STREETS, July, 1961

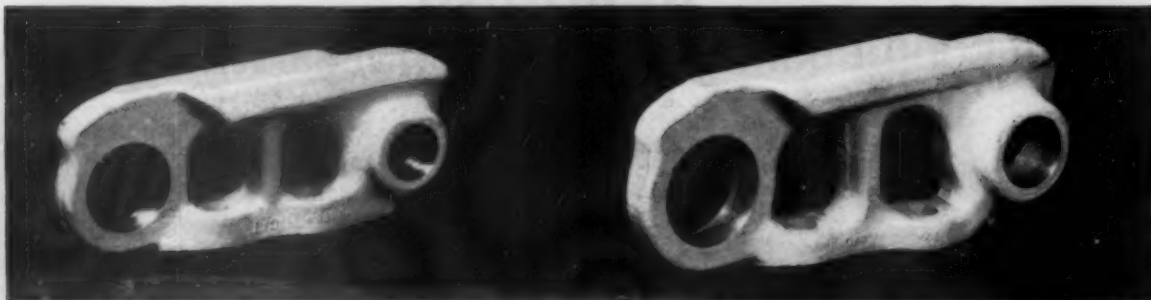
Special report to users of Cat D6 and D7 track parts



Up to 25% Longer Link Life at No Increase in Cost

New track links have rails hardened deeper than any other brand . . . hardness with file-like, wear-resistant qualities

You can't "see" metallurgy and heat treatment in track links. But you'll definitely see the *results* in the extra life you get from the *new* Cat D6 and D7 track links. These superior links will outlast all other brands yet the suggested price is no higher than before.



D6, 955 AND 561 LINKS

- "Hi-Electro" hardened rails give outstanding wear life.
- Rail wear cases are twice as deep as other brands.
- Closer bore tolerances retain pins and bushings better.
- Full 1 1/4" top rail surface to pin boss clearance allows more wear before roller flange contact.

D7, 977 AND 572 LINKS

- 12% thicker rails eliminate peening, rebuilding distortion.
- 32% thicker struts and more steel in critical areas increase over-all strength, resist cracking.
- File-hard "Hi-Electro" hardened rails withstand abrasive wear.
- Uniform, wear-resistant rail cases deeper than other makes.

These new track links are made from special steel, carefully pretested *before* manufacture. They're forged, machined and heat treated to develop maximum strength and toughness. A non-peenable wear barrier is induced *deeply* into rail top and sides by exclusive "Hi-Electro" hardening. This exacting heat treatment permits maximum, file-like wear resistance without brittleness.

Try the new links . . . and the many other *special-purpose* tractor undercarriage parts, all designed and built to keep your cost-per-hour to a minimum. Cat undercarriage specialists can help you select right combinations and give you money-saving recommendations tailored to your particular needs. It's all a part of your Dealer's Custom Track Service . . . the practical approach to lowering undercarriage costs by extending part life and machine availability through proper parts selection and parts care.

Etched rail cross-section shows deep, uniform wear case found on top and sides of new links.



CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

Caterpillar Tractor Co., General Offices,
Peoria, Illinois, U. S. A.

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ROADS AND STREETS

Sixty-Nine years of Editorial Leadership

Washington News Letter

By Duane L. Cronk, Director, Highway Information Services

July 10, 1961

Finally, a firm financial foundation for the National Highway Program has been shoved under the up-and-down multi-billion-dollar undertaking. Facing up to the problem squarely last month, Congress approved the new cost estimate for the Interstate System, boosted authorizations for its completion by a stout \$10 billion, and rewrote the tax laws to provide the necessary money.

In final form, the Federal-Aid Highway Act of 1961 does not follow the financing pattern recommended by the Administration and it does stretch out completion date of the Interstate network two years beyond that contemplated in 1956. But in the light of the highway scandals breaking around the country, the protests of the trucking industry and motorist's representatives and the grumbling of the planners, the new package looks very good indeed.

* * *

The new Act rings down the curtain on a five-year period of uncertainty and disappointment. And it reflects five years of experience with an accelerated Highway program - on the part of national administrators as well as Congress. Its two most significant improvements over the 1956 Act, as far as roadbuilders are concerned, are:

First, by approving the latest estimate of the cost of building the Interstate network, Congress has, in effect approved a construction program billions greater than that drafted in 1956.

Second by providing revenue measures to cover the additional cost, Congress has reaffirmed the sincerity of its intentions and recommitted the federal government to the role of leadership for highway system development in this country.

* * *

Thus, the state highway departments and the highway industry can - for the first time - realistically plan ahead, a consideration as important to contractors, equipment producers and materials manufacturers as the increased sums. Here is the BPR's forecast of what federal-aid payments will be during the next 12 years (preceded by the years 1957-1960 for comparison):

1957	\$ 966 million	1961	\$2,868 million	1967	\$3,724 million
1958	1,511	1962	3,089	1968	3,832
1959	2,613	1963	3,260	1969	3,874
1960	2,940	1964	3,414	1970	3,914
		1965	3,511	1971	4,007
		1966	3,613	1972	4,106

(continued on next page)

The prospects indicated therein are for a 43% increase in federal funds during the next 12 years to be matched by the states, as traditionally, 50-50 on ABC projects, 90-10 on Interstate.

The end of contract controls is in sight now, according to the BPR, and states should be able to spend to the limit of their future apportionments. However, the condition of the Highway Trust Fund, even with the new taxes, will not permit any to spurt ahead. The federal agency hopes that voluntary restraints will make federal controls unnecessary thereafter.

* * *

Meanwhile, ARBA points out, the highway fraternity must not become too complacent over the future of the federal-aid program. The Highway Trust Fund is a tremendous temptation to groups affected by highway construction in one way or another, and the increases won this year could be threatened in a variety of ways. The controversy between mass transit and expressways in urban areas is rising to the boiling point, and there is no doubt but what the rail transit interests will wage a full-scale struggle for some of the highway money. Billions of dollars are at stake here.

In fact, this issue could shape up as a major target for the Better Highway Information Foundation. ARBA, AGC, CIMA and AED representatives cut the Foundation's operating budget last month, but again resumed major responsibility for raising the money. After the success of the public service organization's first year and "National Highway Week," BHIF's backers are convinced of the continuing need for such an industry-wide effort. (See story on page 58.)

* * *

"After the Interstate System, what?" This question is being asked highway leaders responsible for long-range planning. The answers may well determine the future of the roadbuilding industry only a few years from now. What happens when the major routes now being built have been filled to their design capacity? Already, serious thinkers are wondering if more and more pavement is the answer, and the highway engineer's proposal for parallel 8-lane superhighways may require more space and money than people are willing to approve. Design standards for the Interstate System have been in the making for 30 years. What is being planned now for a situation 10 years away?

The first real attempt to explore this problem was proposed in Washington last month by a special policy group set up by the Department of Commerce. The transportation experts, headed by Wilfred Owen, one of the best such scholars in the U.S., want \$50 million invested in a full-scale test of "automatic" highways. Some of the largest companies in the country - RCA, Bendix, GM, Thompson Ramo Wooldridge, and Westinghouse - have been developing electronic controls which, installed in the roadbed, would control the flow of traffic on high speed freeways. Both capacity and safe speed could be increased steeply, they say.

* * *

A 100-mile segment of proposed Interstate highway would be built specifically as a control section. Engineering and construction of the road itself would take \$30 million, the electronic controls another \$20 million. Motorists using the highway would be guided to their desired destination exits from a computer center, their speed, direction and braking regulated along the way. This is one way, the experts believe, the capacity of Interstate routes can be boosted even further.

Step up your

**CRAWLER
TRACTOR**

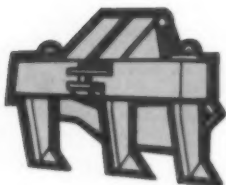
Performance
Operator comfort
Wearability
Ease of maintenance
Reliability



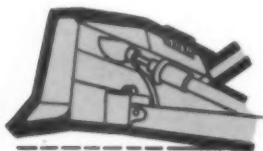
WITH ALLIS-CHALMERS

Analyze the crawler tractor news on the following pages and see how you get the top value to which Allis-Chalmers is committed. This is the result of project "power"—a massive Allis-Chalmers research and development program that brings you the benefits of significant product improvements.





Deep penetration ripper—Allis-Chalmers unique parallelogram ripper design keeps shanks at most effective penetration angle at all depths for fast, sure ripping.



New finger-tip tilt dozer—gives you 20 inches of tilt, controlled right from the operator's seat. Compact, front-mounted, triple-valve, hydraulic unit controls blade tilt, lift and lower, and ripper lift and lower.

BETTER THAN EVER

HD-21

225-hp
Torque Converter
Drive

Dollar for dollar, the HD-21 offers you the biggest dollar value in work capacity in the big-tractor class. Equipped with a 225-hp turbocharged engine and the most proved torque converter drive in the industry, the HD-21 gives you king-size output.

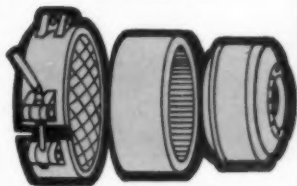
And yet, big HD-21's are practical. They're maneuverable, easy to handle, and in tandem pushing will supply more power than any single unit. If two pushers aren't needed, one can always be split off for other duty.

A complete range of front and rear-mounted attachments makes the HD-21 a match for the big jobs anywhere. It's a proved pusher . . . it's a powerful puller and ripper . . . it's a big-yardage dozer.



NOW!

A MAJOR DESIGN ADVANCE



New oil steering clutches and oil-cooled power brakes on the HD-21 and HD-16 give you new standards of performance . . . new peace of mind regarding maintenance and service life. Both clutches and brakes run in a complete bath of oil so heat is dissipated with extreme efficiency giving you exceptionally long life with minimum brake adjustment . . . *no* clutch adjustment. New power steering and power brakes reduce operator effort, fatigue . . . help him maintain maximum production all day.

BIGGEST VALUE IN THE 150-HP CLASS

HD-16

Torque Converter
or
All-Gear Drive

The HD-16 continues to grow in popularity for one significant reason—big-tractor performance at medium-tractor cost. Pioneering, dozing, hauling, ripping, pushing—this tractor has a tremendous work range. It's in the same horsepower class of the biggest tractors of a few years back—yet in work output, ease of operation and maintenance, it's far and away ahead.

Here is a machine with up to 60,000 lb of drawbar pull, 19 tons of live-action dozing weight, with engines that give you up to 27 percent fuel saving over tractors with comparable-sized power packages.

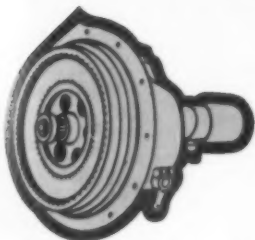


Step up your

Performance
operator comfort
durability
ease of maintenance
Reliability

WITH ALLIS-CHALMERS





New oil master clutch is available in the HD-11 and HD-6. This Allis-Chalmers clutch is extra-heavy-duty with multiple metallic-faced plates that provide big reserve capacity for cool operation, less wear, longer life. Oil is filtered and circulated under pressure.



New finger-tip power steering—now the HD-11 brings you hydraulic power steering with the finger-tip, console-type levers so popular on the HD-21 and HD-16 models.

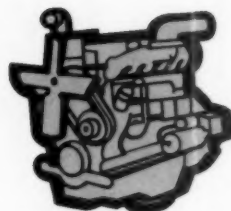
ANOTHER STEP AHEAD in an all-purpose size

HD-11

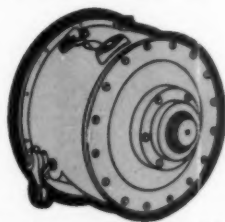
99-hp
All-Gear Drive
111-hp Torque
Converter Drive

The new HD-11 gives you performance that's unmatched in its class . . . and you can also have the 1-2 punch of a powerful new engine, plus the smooth speed and efficiency of torque converter drive. The torque converter, coupled with a constant mesh transmission, three speeds forward, two reverse, gives this machine the kind of performance you would normally expect from larger machines.

In addition, you get output-boosting operator advantages like hydraulically-actuated steering clutches, and with the standard transmission machine, the easiest shift pattern in the industry.



New 10000 engine powers the HD-11. The 6000 engine is featured in the HD-6. Both are fast-starting, responsive, with high torque for top performance in today's tough service. They are open-chamber, controlled-combustion engines delivering high output without even breathing hard.



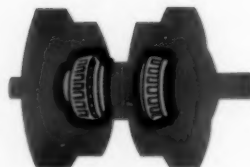
New! Torque converter drive—now Allis-Chalmers offers a torque converter for the HD-11 and HD-6. On big tractors or small, you get the advantages of Allis-Chalmers torque converter experience. Result: outstanding performance and dependability.



**ALLIS-CHALMERS
LEADS THE FIELD
WITH THESE
PROVED TRACTOR
ADVANTAGES**



Industry's healthiest engines—give you up to 27 percent more efficient operation than ordinary engines. Unique controlled-turbulence combustion provides greater energy output on less fuel. Standard in the HD-21, HD-16, HD-11, HD-6.



Tapered wheels, rollers—track for longer life, sign proof that maintenance

THE CLASS OF '61 —and then some

HD-6

66.5-hp
All-Gear Drive
72-hp Torque
Converter Drive

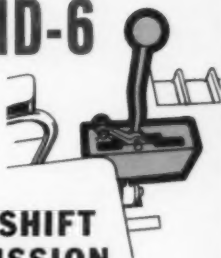
With the HD-6 tractor, you get advantages offered only by Allis-Chalmers in this size class.

You have a choice of three models to match the machine to your requirements:

- Power-shift transmission model with torque converter, plus power steering and power brakes.
- Standard-shift model with oil master clutch, power steering and power brakes.
- Standard-shift model with dry or oil master clutch.

In its size class—dozing, pulling, ripping—the HD-6 gives you the biggest dollar's worth in the tractor industry.

NEW HD-6



POWER-SHIFT TRANSMISSION

Allis-Chalmers has combined smooth torque converter performance with its own Power-Shift transmission incorporating a unique system of hydraulically operated, multiple-disc clutch packs. You get maximum working efficiency, accurate control with finger-tip shifting on-the-go . . . an infinite number of speeds through the entire working range (up to 5.9 mph). But that's not all!

Amazing automatic "GROUND SPEED CONTROL"

Allis-Chalmers exclusive *Ground Speed Control* system lets your operator pre-select and set the best working speed to match special conditions—slope cutting, finishing or pioneering. Now, for the first time, he has power-shift ease *plus*—broad, torque converter speed ranges, *plus*—amazing, automatic *Ground Speed Control*.



ered roller bearing truck
heels, idlers and support
ers—ride freely on the
ack for reduced friction,
nger life. This modern de-
n provides the alignment
t makes Positive Seal per-
nent lubrication effective.

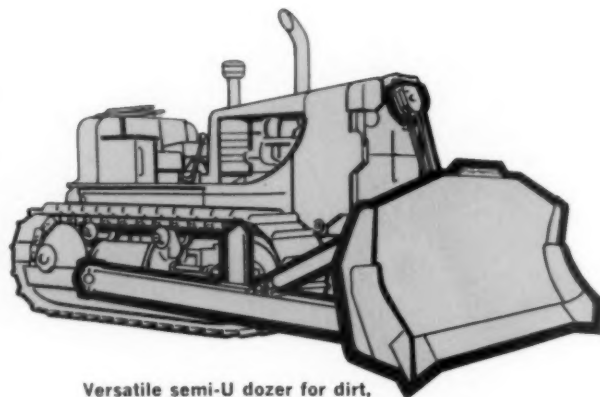


True-dimension track—specially heat-treated track shoes, side bars, track pins and bushings are in a class by themselves. Heavy-duty design of the truck frames, track guiding guards and the clean bottom construction, makes this undercarriage the best in the industry.

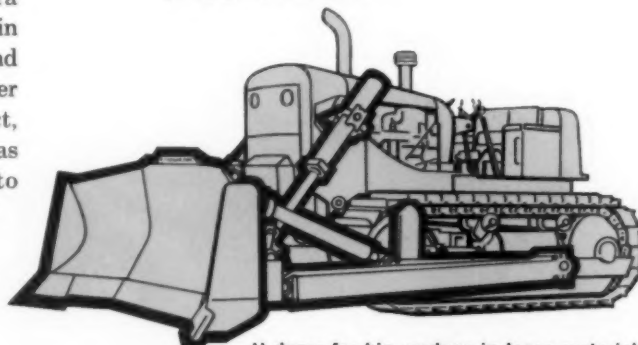
NEW, BIGGER AND STRONGER DOZERS FOR EVERY TRACTOR MODEL

You get the new U moldboard for big production in loose or semi-loose materials, and the semi-U blade for all-round dozing. Equipped with the unique rock bit, the semi-U is unequaled for rock and quarry work. You get new, straight dozers with increased height in center section for bigger capacity without sacrificing visibility.

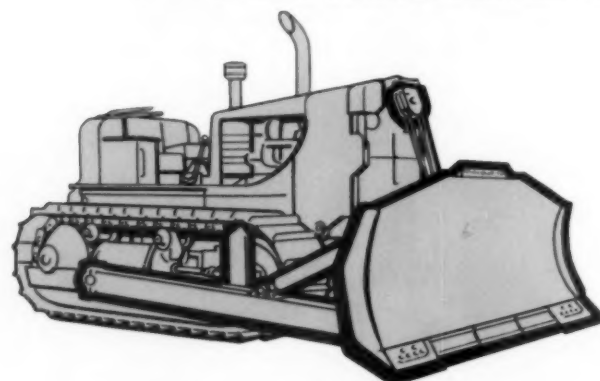
All these dozers have extra heft and strength for long life in tough duty. Cutting edges and end bits are wider and heavier for extra wear. In every respect, these dozers lead the way as Allis-Chalmers continues to step up tractor performance.



Versatile semi-U dozer for dirt, quarry jobs, rock work.



U dozer for big yardage in loose material.



Straight dozer for all types of earth moving, brush clearing, cleanup—many other jobs.

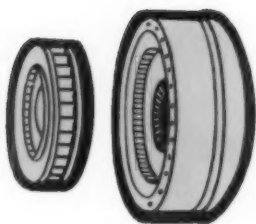


New F-100 cable-control unit for HD-21, HD-16, HD-11 dozers

A revolutionary design concept, the F-100 cable-control unit is the only fully sealed unit in the industry. Brakes, clutches, gears—all controls—run in a bath of oil. The F-100 seals out dirt and moisture—requires no lubrication. This cool-running, sure-acting unit has already recorded new standards for exceptionally long life.

The benefits of
ALLIS-CHALMERS
CONTINUING RESEARCH
extend across
the entire tractor industry

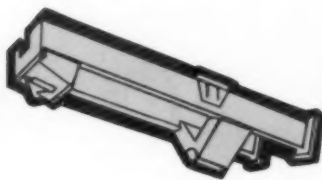
Here are a few standout examples among the many developments instituted by Allis-Chalmers. First with a torque converter tractor, Allis-Chalmers pioneered a whole new concept of tractor performance with this bold departure from conventional power transmissions. Another first, extended lube intervals for truck wheels, idlers, and rollers, culminated in today's permanently lubricated units. Allis-Chalmers unit construction of major assemblies has saved untold hours of maintenance time. The main frame design idea of mounting major components to a heavy-duty, channeled frame resulted in shock-resisting, longer-lasting tractors.



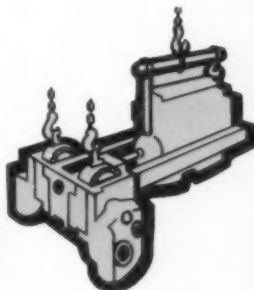
Torque converter drive



Permanent lubrication



All-steel main frame



Unit construction

AND
DESIGN IMPROVEMENTS
KEEP ON THE MOVE

Built into your 1961 Allis-Chalmers tractors are improvements to further boost performance, step up component life and dependability, increase operator comfort and convenience, ease the job of maintenance and service.





ALLIS-CHALMERS NEW HD-3 TRACTOR

BIG PERFORMANCE IN A COMPACT PACKAGE

H-3—43-hp gasoline engine HD-3—40-hp diesel engine

No tractor of comparable size gives you the strength and performance advantages of this new tractor.

It has the leadership features of Allis-Chalmers big tractors—industry's toughest track, all-steel main frame, top accessibility of major components—plus heavy wrap-around grille, diesel or gasoline engine, oil-

type shuttle clutch.

The shuttle clutch puts this tractor way out front in faster cycle speeds. You can shift from any of the four forward speeds to the comparable reverse speed without shifting gears.

This tractor is built to stand up to the tough requirements of construction work.

**STEP UP
YOUR**



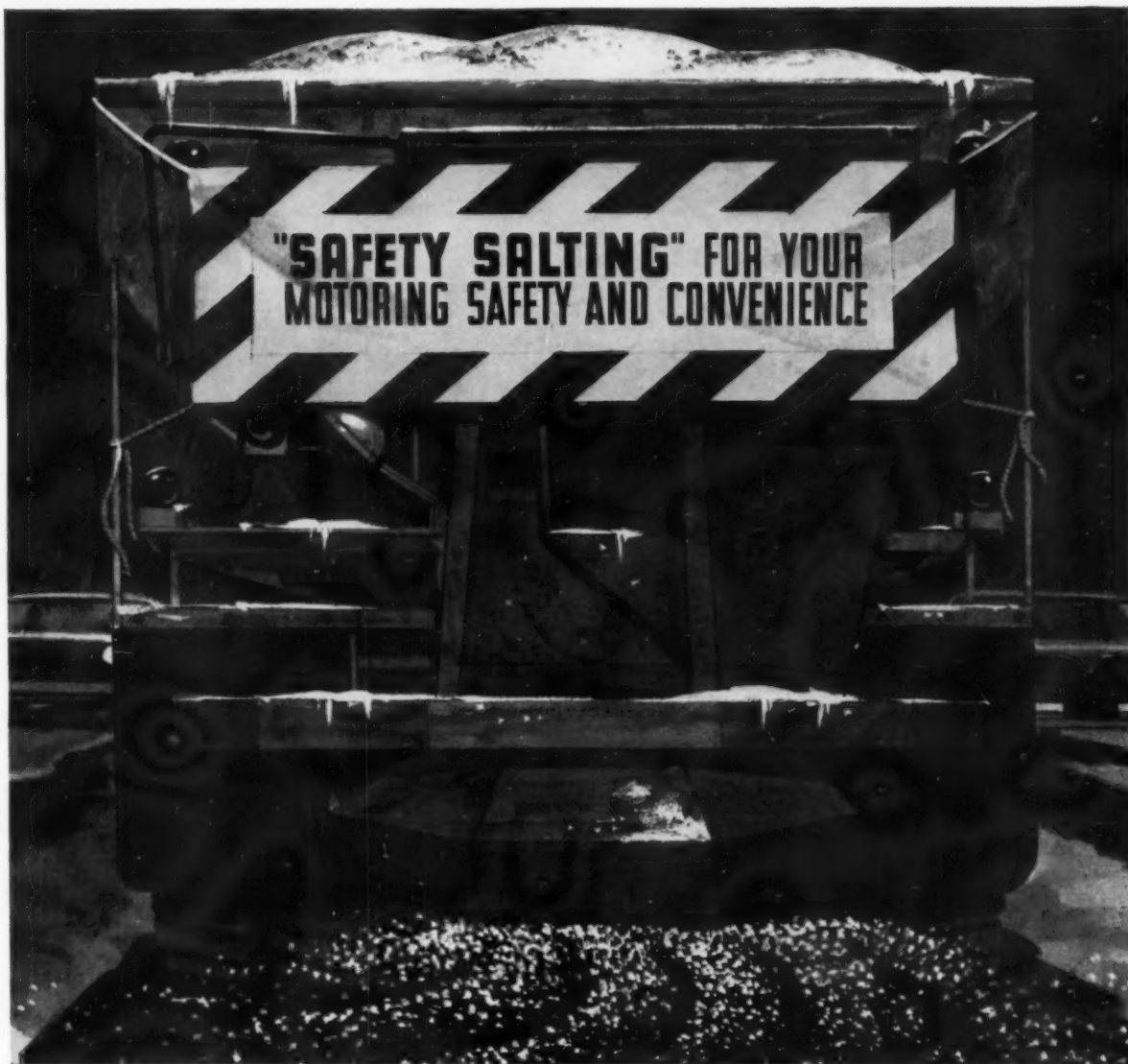
Performance
Operator comfort
Wearability
Ease of maintenance
Reliability

GET THE FULL STORY FROM YOUR ALLIS-CHALMERS DEALER

These are the highlights of a continuing program to give you the most modern tractors in the industry. Your Allis-Chalmers dealer is eager to tell you about these and other improvements and to prove their value with a demonstration. You will see that Allis-Chalmers tractors are built to step up output and cut your costs. *Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.*

WITH

ALLIS-CHALMERS
POWER FOR A GROWING WORLD



NOW! An ice control program that cuts accidents and complaints!

The Morton Safe-T-Salt* Ice Control Program can help you accomplish two important jobs this winter . . . public safety and public relations!

Streets are safer when they are salted with Safe-T-Salt, because it is a screened and graded rock salt that gets rid of dangerous ice and snow in the quickest, safest, most economical way possible.

The name "Safe-T-Salt" was developed to explain this job to the public. As you know, too many uninformed citizens complain about de-icing programs every winter. The "Safe-T-Salt" name will cut down those complaints by emphasizing the safety value of salting treacherous pavements . . . will keep the public aware of your efforts to reduce winter driving hazards.

The truck banner in the illustration above represents one way that safety salting can be made popular. These banners are available free to Morton Salt customers. Your Morton representative can supply them and other material . . . as well as furnishing you with helpful publicity features for your local newspapers, explaining the value of de-icing programs. He'll be glad to help you start planning *now* for a safer and happier winter.

FOR MORE INFORMATION ON MORTON
SAFE-T-SALT, MAIL THIS COUPON TODAY

Please have a Morton Salt representative call me for an appointment to explain all the advantages of your Safe-T-Salt program.

Name

Title

Address

City Zone State

MORTON SALT
COMPANY

INDUSTRIAL DIVISION

Dept. RS7, 110 N. Wacker Drive, Chicago 6, Ill.

*Safe-T-Salt is a trademark of the Morton Salt Company



... for more details circle 338 on enclosed return postal card

ALLIED Jet Seal

THE ORIGINAL TWO-COMPONENT
POLYSULFIDE POLYMER ELASTOMERIC
JOINT SEALING COMPOUND

IS THE SPECIFIED SEALANT IN
MAJOR CONSTRUCTION PROJECTS
ACROSS THE NATION *



Specified by highway departments the nation over, Allied JET SEAL, Product 9015H, is the most effective concrete joint sealant ever devised.

Together with the exclusive Allied Applicators, Model 8591-D and X691-E, JET SEAL gives economy of application, durability and exceptionally long life.

- JET SEAL is improved in adhesion, cohesion, resilience and low-temperature ductility (-20°F).
- JET SEAL has no gravity or cold flow tendencies even at 200°F or more.
- JET SEAL will prevent incorporation of incompressible materials.
- JET SEAL is quick-curing. Construction can be opened to all traffic within one hour.



These highway departments specify Allied JET SEAL:

California
Connecticut
Georgia
Minnesota
New Mexico
North Carolina

New York Dept.
of
Public Works

Rhode Island
South Carolina
Tennessee
Texas
Utah
Virginia

FOR MORE INFORMATION ABOUT Allied JET SEAL, and the ALLIED-STROUD APPLICATORS, Write to:

ALLIED BUILDING • 5101 N. PENNSYLVANIA • P.O. BOX 7278
39TH STREET STATION • OKLAHOMA CITY, OKLA.
PLANTS: STROUD, OKLA. • DETROIT, MICH. • LOS ANGELES, CALIF.

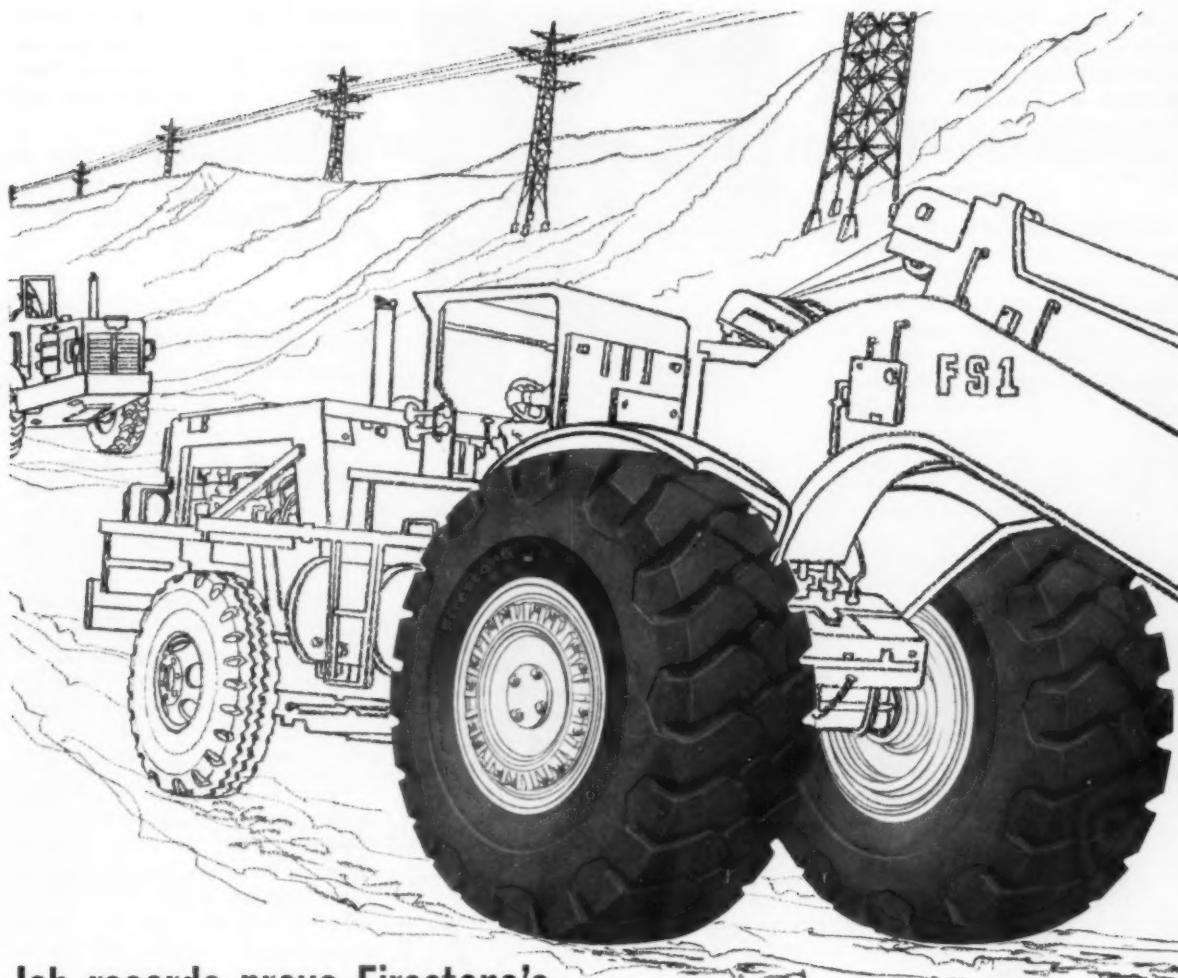
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30

ALLIED MATERIALS CORP.

PRODUCERS, REFINERS AND
COMPOUNDERS OF SPECIAL
ASPHALT AND COAL TAR PRODUCTS

ROADS AND STREETS, July, 1961



Job records prove Firestone's **TIRE TEAM KEEPS LOST YARDAGE DOWN!**

1. **Firestone Giant Tires** work harder, last longer because they're built with exclusive Firestone Rubber-X. Longer wearing Rubber-X is more resistant to cuts, and teamed with *bonus-ply* Shock-Fortified cord bodies you get extra toughness and stamina to take tire-killing impacts hour after hour. That's why Firestone SUPER ROCK GRIP (WB) tires keep equipment rolling to keep production up, lost yardage down.
2. **Firestone Giant Tire Service** puts an off-the-highway tire Specialist on your project 24 hours a day to handle all of your tire service needs and do the worrying for you. He'll help make your finish dates good!

Keep penalty day losses off your books—get Firestone's 1-2 Giant Tire Team working for you! Get more details from your Firestone Dealer or Store. Or write: Manager, Off-The-Highway Tires, The Firestone Tire & Rubber Company, Akron, Ohio.

Always Specify Firestone Tires When Ordering New Equipment.

Firestone

FIRST IN OFF-THE-HIGHWAY TIRE NEEDS

Copyright 1961, The Firestone Tire & Rubber Company

ROADS AND STREETS, July, 1961

... for more details circle 306 on enclosed return postal card

David L. Harrington, chairman of the executive and management policy committee of the Reuben H. Donnelley Corporation, publishers of *Roads and Streets*, died on June 2 at the age of 66.

His career from an Iowa farm boy through the ranks of the Donnelley Corporation to President, 1951 to 1957, and chairman of the board and chief executive officer, 1957 to January 1961, was paralleled by his active participation and leadership in numerous business, civic and welfare organizations.

Mr. Harrington was president of the Illinois Chamber of Commerce in 1958-1959. In the latter year he became the first president of the Business Mail Foundation. Also in 1959 he served as chairman of the National Cancer Crusade and was elected a director of the American Cancer Society.

He was a member of the executive committee of the National Civil Service League, president of the Chicago Athletic Association,



David L. Harrington

member of the Executive Club, member of the board of the Cook County Tuberculosis Sanitarium, member of the board of Junior Achievement of Chicago and active in the work of the Chicago Community Fund.

Mr. Harrington, during his years as president and chairman of the Donnelley Corporation, was a vital influence on the growth and development of its magazine publishing division, of which this publica-

tion is a part, from a nucleus of three business papers to twenty-two highly specialized magazines serving a wide variety of industrial and professional fields.

Mr. Harrington is survived by his widow, Mrs. Blanche Harrington; a son, Edward, and three grandchildren.

Kansas Interstate Bridge Costs Set Midwest Pace

Average costs for overpass bridges on Interstate highways in Kansas during 1960 were the lowest in seven Midwest states, according to a report prepared by the U.S. Bureau of Public Roads regional office at Kansas City.

Mitchell D. Smith, assistant regional bridge engineer, Kansas Highway Commission, compared the costs per square foot of bridge roadway in Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota.

This tabulation shows Kansas bridge costs for crossroad structures to average \$7.52 per sq. ft. This is \$1.79 per ft. less than the costs in North Dakota which was second low, and only one-half the cost of the overhead structures in one of the states.

In his report, Smith pointed out that crossroad and other grade separation structures constitute the largest single category of bridge work on the entire Interstate system of highways.

"In the seven states there remain to be constructed some 2,000 crossroad bridges which will cost approximately \$180 millions. Consequently any cost saving treatment or design change that has general application would be important when multiplied by so large number of units," said Smith.

For comparisons, Smith studied 94 bridges let for contracts totaling \$8,495,051 during 1960 in the seven states. Smith noted that the prevailing width of the interstate roadbeds is substantially the same in each of the states, and all states have adopted a four-span design with one pier in the center of the median strip, and a pier on the outside of each roadway.



The Hanson mechanical materials handling crane is a rugged, maneuverable rig that is saving time and reducing materials handling and labor costs for thousands of contractors and industrial plant engineers.

To see how a Hanson 3 or 5 ton mechanical, or a 6 ton hydraulic crane can meet your specific needs, call your Hanson dealer or write to Hanson Machinery Co., Tiffin, Ohio.

HANSON

Builders of some of the country's finest shovels and cranes of the smaller capacities.

MATERIALS HANDLING CRANES Mechanical and hydraulic, 3, 5 and 6 ton.

EXCAVATORS Crawler, rubber and truck mounted: $\frac{3}{4}$ to 1 yard shovels; 5 to 25 ton cranes.

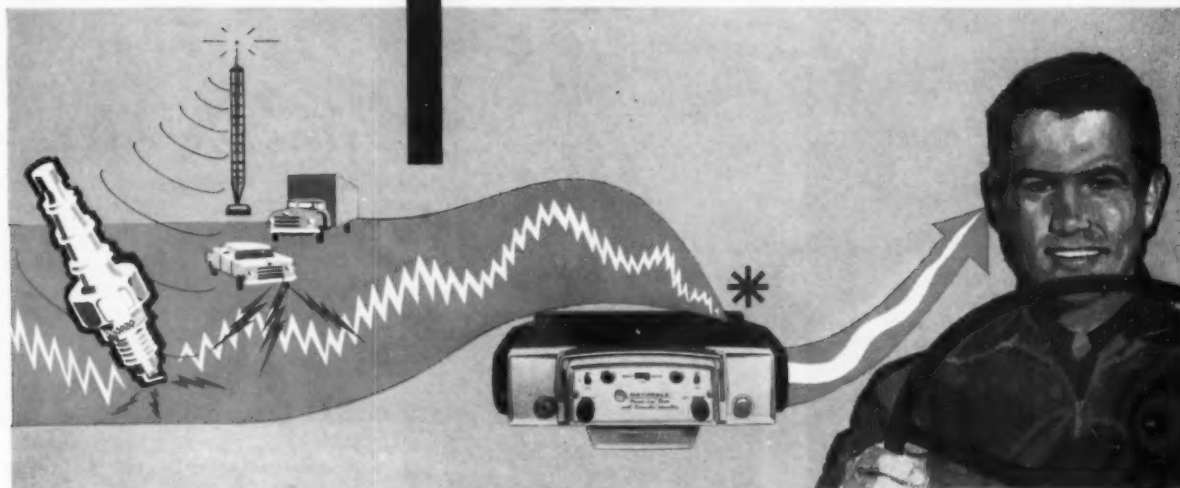
Dealerships in some areas still open.

HANSON MACHINERY CO.
TIFFIN, OHIO

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**new... Motorola
MOTRAC radio with**

EXTENDER operation



* CUTS OUT IGNITION NOISES

Dramatically Improves Overall Efficiency In 24-50 mc 2-Way Radio Systems

Motorola MOTRAC radio with Extender operation puts ignition noise suppression where it does the most good—built right into the receiver. Here it suppresses ignition noises from your own vehicle as well as those in the vicinity... providing the answer to the biggest problem in low-band 2-way radio systems today.

First and foremost, Extender operation improves reception throughout your system. In as much as $\frac{1}{5}$'s of your territory, ignition noises can garble your messages. Now messages are clear. "Hash" caused by ignition noise is gone. *Second*, you can "extend" useable operating range where ignition noises are high. Motorola Extender operation suppresses disrupting ignition noise on weak, fringe area signals allowing the message to come through clearly—right out to the limits of your radio coverage. *Third*, you can reduce interference from other radio systems (extraneous messages, ringing and other noise interference known as intermodulation)... just flip the switch on the control head.

"MOTRAC" is a trademark of Motorola Inc.

HEAR FOR YOURSELF

Send in coupon NOW
for a free, on-the-job recording...
listen to the dramatic
difference in message clarity.

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A Subsidiary of Motorola, Inc. Dept. ARS128

- ☐ Send me phonograph record
☐ Have salesman phone for appointment

Name _____ Title _____

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MOTOROLA 2-WAY RADIO

CASTINGS?

That's all we make!

And on hand for immediate delivery are thousands of standard designs such as —



What's more, we have

15,000

patterns from which construction castings can be produced fast.

Our 168 page catalog of Gray and Ductile Iron castings will be sent promptly upon request.

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COMPANY**

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People

Joseph McCoy Heads Equipment Group

Joseph W. (Joe) McCoy, vice-president of E. D. Etnyre & Co., Oregon, Illinois, is re-elected chairman of the CIMA Bituminous Distributor Manufacturers Bureau. E. Sterling Brent, sales manager, Littleford Bros., Inc., Cincinnati, Ohio, is re-elected vice-chairman.

This Bureau, sponsored by the Construction Industry Manufacturers Association (CIMA), includes: E. D. Etnyre & Co.; Littleford Bros., Inc.; Municipal Supply Co.; Rosco Manufacturing Co.; Seaman Corporation, Seaman-Gunnison Division; Standard Steel Works, Inc.



Joseph W. McCoy

New International Road Group Directors

New directors announced by the International Road Federation, Washington, D. C., are Arthur J. Lichtinger, executive vice-president, The Wellman Engineering Company; C. F. O'Neil, vice-president for foreign operations, The General Tire & Rubber Company; and Alexander S. Wilner, vice-president, foreign division, White Motor Company.

Joseph Frank of Ford International, was designated secretary of IRF. He succeeds J. H. Gilbert, Capitol Engineering Corp.

Corrugated Metal Pipe Association Names Garrett

G. H. Garrett, of Thompson Pipe and Steel Company, Denver, Colorado, is elected President of the National Corrugated Metal

Pipe Association. Other new officers include, A. J. Mistler, Armco Drainage & Metal Products, Inc., Topeka, Kansas, vice-president; B. G. Stone, Spokane Culvert & Fabricating Co., Spokane, Washington, vice-president; and G. R. Betts, of Armco at South Bend, Indiana, secretary-treasurer.

Immerman Chosen President of Moles

Harry T. Immerman, vice-president and chief engineer of Spencer, White & Prentiss, Inc., was elected president of The Moles, an association of heavy construction engineers and executives.

Other officers elected were: Eugene G. Rau of J. Rich Steers, Inc., 1st vice-President; Howard G. Dixon of Johnson, Drake & Piper, Inc., 2nd vice-president; Joseph B. Diamond, treasurer; Eugene F. Moran, Jr., of Moran Towing Corporation, secretary, and Herbert Giles of Harold Dessau, Inc., sergeant-at-arms.

Mr. Immerman, a native of New York City and resident of Larchmont, N.Y., was The Moles Member Award winner for 1961 (award presented at the Waldorf January 25). Following a varied early experience, Immerman began with Spencer, White & Prentiss in 1923. A contemporary has said of him "it would be difficult to name anyone who has personally designed solutions to more foundation, underpinning and shoring problems."

Steel Institute Awards Civil Scholarships

Ten high school seniors recently won \$1,000 scholarships in civil and architectural engineering, in the annual program of the American Institute of Steel Construction. Competing in the nationwide contest were 47 high school seniors representing 21 states and sponsored by 33 members of the AISI, the national organization representing the structural steel fabricating industry. D. Ray Park, chairman of the AISI Committee for

Continued on page 40



E. J. Petrillo's Yonkers Contracting Co. speeds drilling of $3\frac{1}{2}$ million yard cut at Jugtown Mountain with three Ingersoll-Rand Crawlmasters.

new **SUPER-POWER** crawler drills help move Jugtown Mountain

In one of the largest highway road cuts east of the Mississippi, a $3\frac{1}{2}$ million cubic yard "bite" is being taken out of Jugtown Mountain near Phillipsburg, N. J. The 117-ft deep cut requires removal of a million and a half cubic yards of granite gneiss—and the heavy drilling is being done by three of Ingersoll-Rand's new hydraulic-feed Crawlmaster drills.

Purchased for this job after competitive tests, the Crawlmasters are putting down $4\frac{1}{2}$ " holes 18 to 20 ft deep spaced on a 9 x 10 ft grid. Using the new D-525 drifter with $5\frac{1}{4}$ " bore, they easily out-drilled two $5\frac{1}{2}$ " bore machines and

are heavier and more ruggedly built throughout. Outstanding features include constant-pressure hydraulic feed and retraction, throttle-controlled reverse rotation, hydraulic tower positioning from vertical to horizontal, rugged tractor-type crawlers with enclosed gear drive from two $11\frac{1}{2}$ -hp air motors, and four 30" stroke hydraulic leveling jacks. Capable of percussion, rotary or Downhole drilling of 4" to $6\frac{1}{2}$ " holes at any angle, the Crawlmaster is the most rugged and versatile machine of its type ever developed.

Supplementary drilling on steep slopes is done by six Crawl-IR drills and all air for the project is provided by one 900-cfm and six 600-cfm Gyro-Flo portable compressors.

Ask your Ingersoll-Rand engineer for the complete Crawlmaster story—or send for Bulletin 4211.

One of the Crawlmasters makes short work of angle-drilling a larger boulder.



Ingersoll-Rand

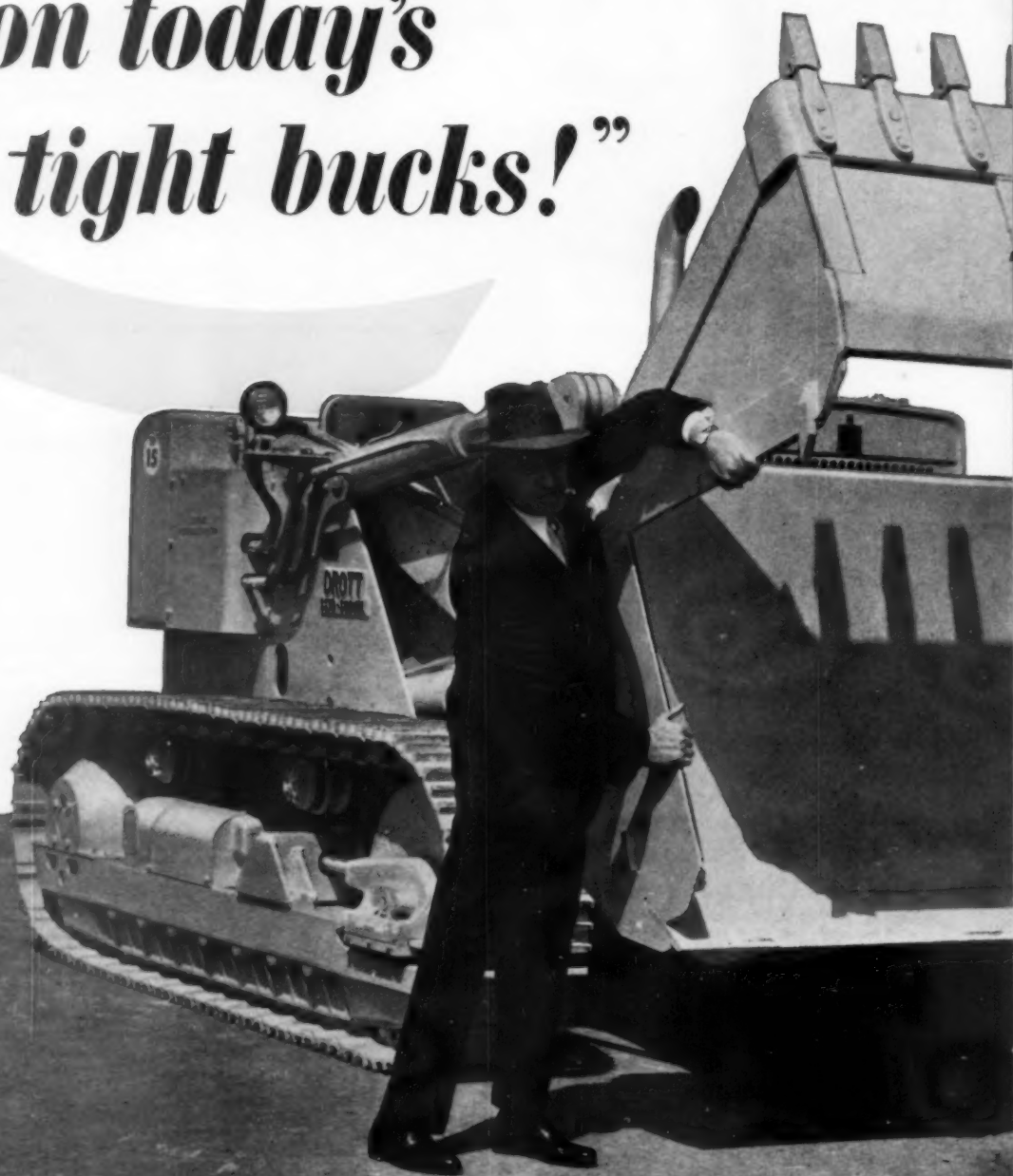
32A5 11 Broadway, New York 4, N. Y.



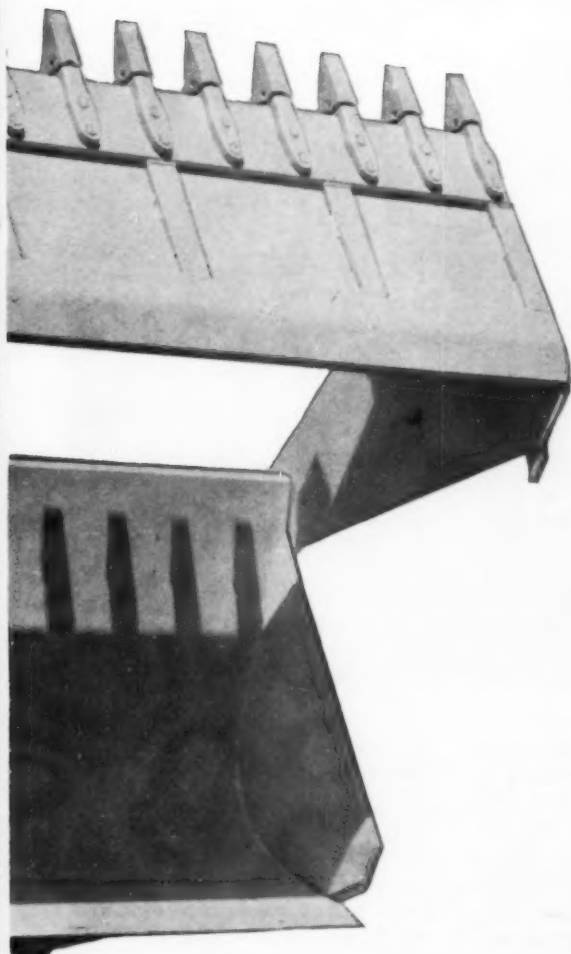
A CONSTANT STANDARD OF QUALITY
IN EVERYTHING YOU
NEED FOR DRILLING ROCK

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***“Mister...it
clam-action to ‘put the
on today’s
tight bucks!”***



takes bite'



"15 minutes on this new '15' Four-in-One will prove you can't afford to own any limited-duty bucket!"

"Sure, a racehorse loader with a 'lock-jawed' bucket may gain you a few minutes a day—just dipping from a stockpile and dumping in a truck!

"But anywhere else we double-challenge you to stack any limited-duty loader against a new '15' clam-action 4-in-1, and see what happens. We can tell you right now what'll happen no matter what size, shape or color the single-action rig is, or how shifty it is! It'll get clobbered! And, profitwise, so will the guy who buys the obsolete bucket without bothering to find out what a slew of jobs the new '15' Four-in-One does.

"You can get the straight dope, first hand in 15 minutes, on this new TD-15 Four-in-One. In just one quarter-hour, you can prove what it means to own the one and only machine that doubles for a whole spread of contracting equipment—at the touch of a hydraulic lever.

"In only 15 minutes, you can put the 'bucket with the bite' through its paces. Prove how you get four, or a dozen, or more, full-sized, full-capacity machine actions with the exclusive 4-in-1. Prove you get hundreds of job-handling working positions with each action.

"See how new TD-15 Four-in-One get-up-and-go is tailored to set a fast work pace, with the single-stick shift, full-reverse transmission, and plenty of hydraulic control power.

"C'mon in now—take 15 minutes on a new '15' Four-in-One. Or call us for a demonstration on your job. See for yourself why you can't afford to own any obsolete 'lock-jawed' loader."

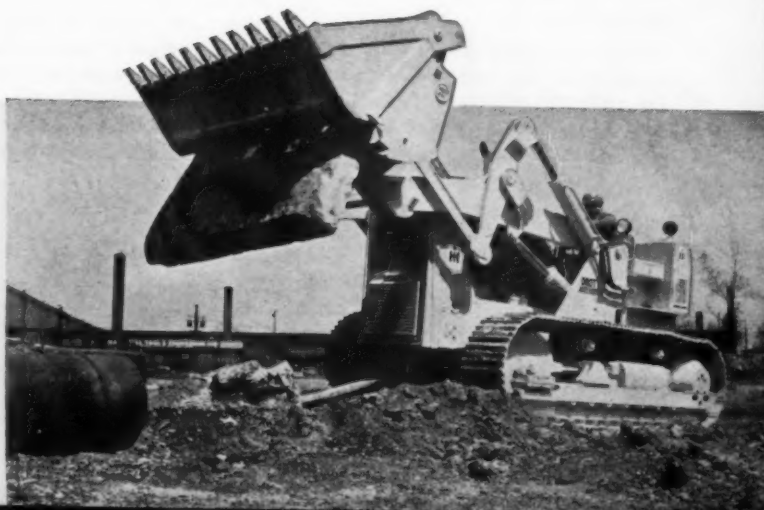
International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin



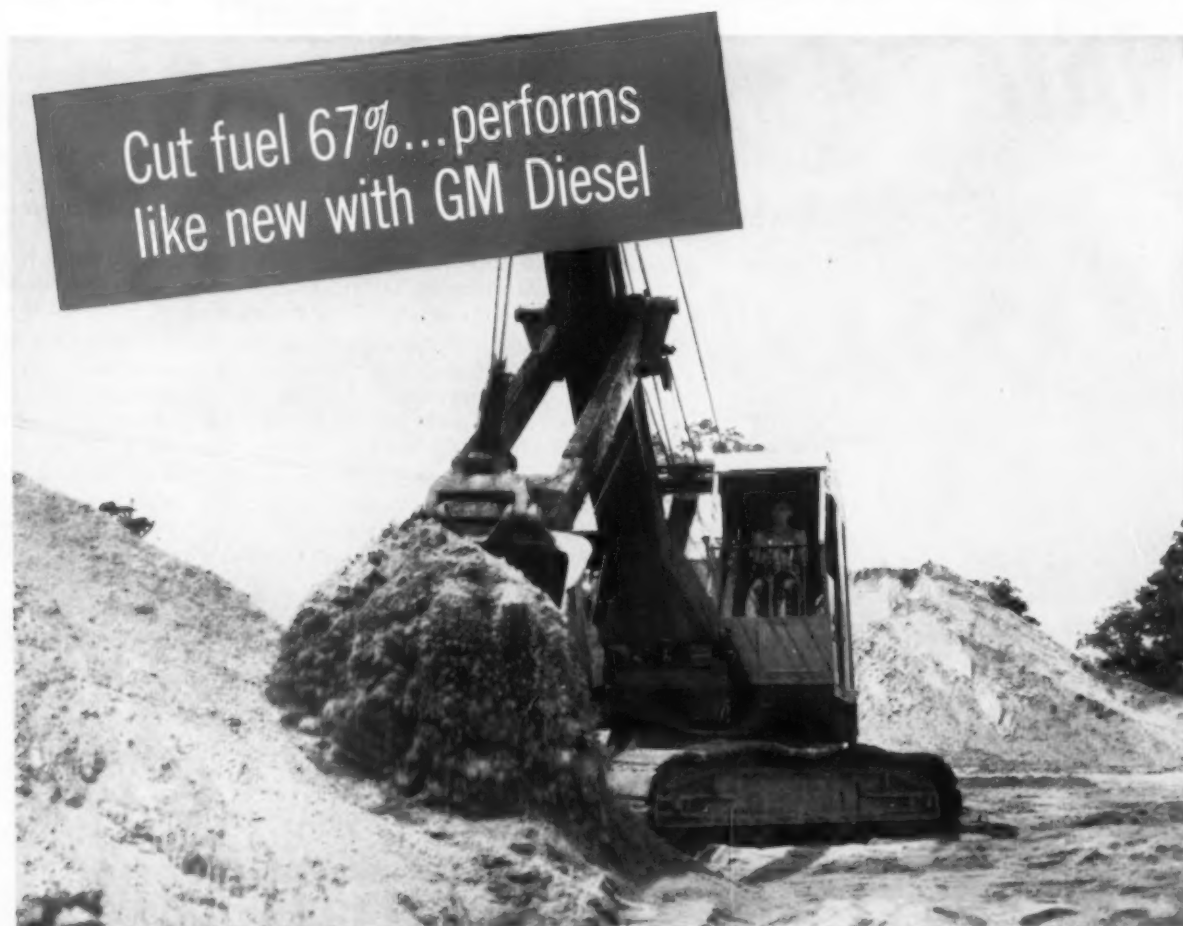
INTERNATIONAL®
DROTT®

"Doze, grade, grab, spread, do cut-and-fill work, strip, load sticky materials, outshovel a power shovel, pick up loose materials (without chasing them), grub, load 'impossibles'. Do dozens of other profitable jobs with the new '15' Four-in-One that single-action loaders can't touch."

... for more details circle 351 on enclosed return postal card



GET REAL PRODUCTIVITY



When you can get a twelve-year-old shovel to move 1800 tons a day on only 15 gallons of fuel—and “perform with the responsive smoothness and economy of a new shovel”—you’re getting real productivity!

And that’s exactly what South Jersey Construction Co., Riverside, New Jersey, got when they repowered their $\frac{3}{4}$ -yard Link-Belt with a “3-71” GM Diesel.

With the previous gasoline engine, they

were burning 40 to 45 gallons of fuel a day. Their 3-71 “Jimmy” has cut this to only 15 gallons of lower-cost Diesel fuel.

South Jersey Construction have found their GM Diesel powered equipment more economical, say this about its performance—“We let the GM Diesels go five months without attention, merely changing lube oil as we go. The equipment with GM Diesels never seems to

lose power. Acceleration is snappy and there’s plenty of reserve power.”

If that’s the kind of productivity and performance you’d like from your equipment, specify GM Diesel when you buy or repower. There’s a model to fit nearly every type of construction equipment. For details, see your GM Diesel Distributor. He’s in the Yellow Pages under “Engines, Diesel,” or write for more information.

GM DIESEL ALL-PURPOSE

GET A GM DIESEL ENGINE

Fast-moving loader saves investment in second unit



"The Trojan with the GM Diesel is a fast-moving, highly maneuverable piece of equipment that seems to be all over the yard at one time," says Charlie Young, Plant Manager for Young Bros. Contractors, Waco, Texas.

Young Brothers have used this Model 154 Trojan Loader with a "3-71" GM Diesel since March 1959—are very pleased with its performance and productivity. The unit stockpiles and serv-

ices an asphalt plant and crusher—moves up to 1200 tons per day.

"It does the work ordinarily requiring two pieces of equipment, thereby saving us the investment and upkeep of a second unit," says Mr. Young.

That's the kind of profit-making productivity Young Brothers have come to expect from their "Jimmys." They bought their first GM Diesel powered unit in 1946—now operate 22 GM Diesels.

How about you? Ready to repower or buy new equipment? Get the facts on GM Diesel power. See your GM Diesel Distributor. He's in the Yellow Pages under "Engines, Diesel," or write direct.

POWER LINE

... for more details circle 320 on enclosed return postal card
ROADS AND STREETS, July, 1961

Sets the
standard of
Diesel
productivity



GM DIESEL

DETROIT DIESEL ENGINE DIVISION,
GENERAL MOTORS, DETROIT 28, MICH.

In Canada: GENERAL MOTORS DIESEL LIMITED, London, Ontario
Parts and Service Worldwide



... **BUT** we do design and Build Equipment YOU require

There are several methods and techniques of batching, mixing and transporting concrete for highway, airport or structural construction. Which procedure is best, cost-wise and profit-wise depends upon many, many considerations.

Quite possibly the re-awakened interest in pouring ready mixed from high production, highly portable plants, central or transit mixing plant, directly to the paving forms may be most efficient for certain jobs.

Again, perhaps the work can be most efficiently handled by a plant batching to a paver or pavers.

THE POINT IS THIS: *No one can state categorically that one method suits all jobs. It simply is not true.*

That is why the policy of the BUTLER BIN COMPANY is to place at your command experienced consultation and the finest, most efficient equipment modern engineering, science and technology has developed — for any and every method and every job condition that produces the best concrete — at a better profit for you.

We don't run your business — we simply make it easier for you to run it — at peak efficiency.

So—whatever may be your problem or your thoughts are about methods, contact your BUTLER Distributor for an unprejudiced discussion of the equipment you will need.

BUTLER BIN COMPANY

959 Blackstone Ave. • Waukesha, Wisconsin

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40

People

Continued from page 34

Education and president of Smith & Caffrey Steel Co., Inc., Syracuse, N.Y., announced the winners.

Roy Jorgensen Starts Management Firm

Roy E. Jorgensen, engineering counsel for the National Highway Users Conference for the past 10 years, has resigned to open his own highway management and engineering consulting service, with headquarters in Chevy Chase, Maryland.

In this capacity he will be re-

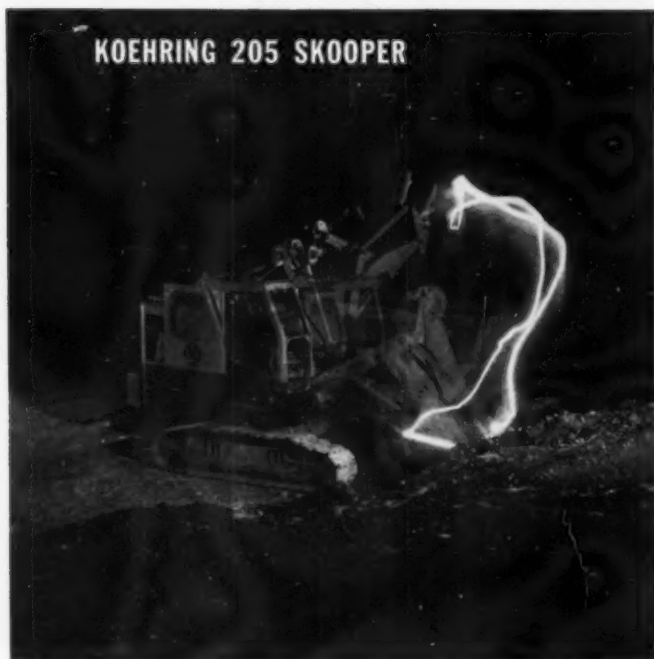


Roy E. Jorgensen

tained by NHUC to direct the highway management conferences sponsored jointly with the AASHO. He also will be an advisor to the NHUC committee which judges the state road program reports, considered eligible for NHUC's biennial Golden Milestone Award. Jorgensen was chief engineer of the Connecticut Highway Department, and earlier had served with the Bureau of Public Roads.

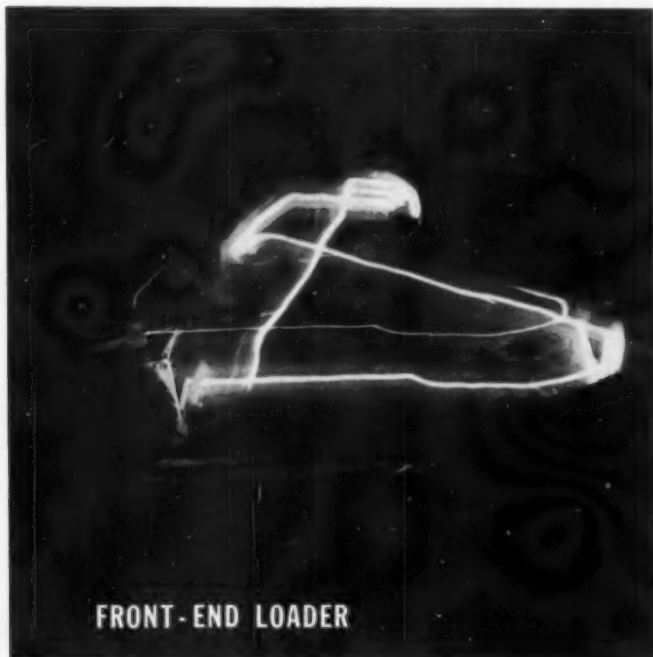
JOSEPH D. BONNESS, Milwaukee contractor, was named the 1961 "alumnus of the year" by Marquette University and honored at the school's recent commencement exercises. Bonness heads Joseph D. Bonness, Inc., road construction firm, and also Highway Pavers, Inc., and Koch and Bonness, Inc. He is a past president of the Wisconsin Road Builders Association and of the Contractors division of the American Road Builders Association.

"RIVERS OF LIGHT" SHOW HOW SKOOPER OUTPERFORMS FRONT-END LOADER



KOEHRING 205 SKOOPER

SKOOPER'S standstill loading creates a light pattern that's short and compact... not long and extended like the one for the loader!



FRONT-END LOADER

Cycle Test Proves SKOOPER Best!

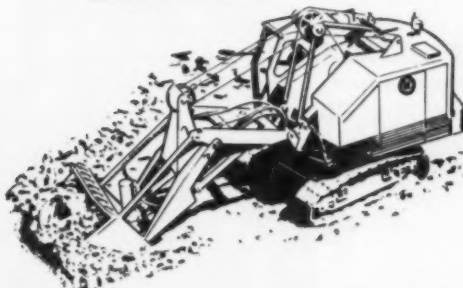
Shown here are actual time-exposure photographs of a Koehring 205 SKOOPER and a rubber-tired front-end loader of similar bucket capacity going through actual digging and dumping cycles under identical conditions. A light was attached to the bucket of each machine and the light pattern traced by each bucket was recorded by time exposure photography.

The light patterns show that with SKOOPER, all motion means work . . . there are no flying starts, no spinning tires, no churning crawlers, no waste drive-in, back-off motion . . . SKOOPER stays in one spot and really bails dirt, delivers big loading tonnages, using less horsepower with less maintenance!

See your Koehring distributor for complete details on the profit pattern that SKOOPER can produce for you!

K-100

*There's Nothing Like it
on Wheels or Tracks!*



KOEHRING
DIVISION OF KOEHRING COMPANY
Milwaukee 16, Wisconsin

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New Publications

Compressed Air and Gas Handbook

Compressed Air and Gas Handbook. All new 3rd Edition. Published by Compressed Air and Gas Institute, 12th Floor, 55 Public Square, Cleveland 13, Ohio. 592 pages (6 x 9), 323 illustrations; cloth-covered board cover. Price \$8.00. Available at above address or at local bookstores.

Written by industry specialists this handbook is rated as the best reference of its kind. The wealth of data are given in graph or table form wherever possible. Contractors and those engaged in highway and street maintenance will particularly welcome the sections on air-operated rock drills and related equipment, pneumatic tools and principles of the compressed air system.

Other chapters cover various industrial applications, with helpful discussions on such topics as air

economy and central versus multiple-unit compressor systems, maintenance and lubrication, and many others.

Highway Statistics, 1959

The Bureau of Public Roads, U.S. Department of Commerce, has published a new 153-page bulletin, Highway Statistics, 1959. This is the 15th in the annual series presenting statistical and analytical tables of general interest. The data covers motor fuel, motor vehicles, highway-user taxation, state and local highway financing, road and street mileage, and federal-aid for highways. Available from Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C., at \$1.00 per copy.

The previous annual issues of the series, and the most recent cumulative summary, are also available from the Superintendent of

Documents as follows: 1958, \$1.00; 1957, \$1.25; 1956, \$1.00; 1955, \$1.00; 1954, 75 cents; 1953, \$1.00; 1951, 60 cents; 1948, 65 cents. Highway Statistics, Summary to 1955, \$1.00.

1960 Supplement to ASTM Standards

Heavy paper cover; 10 parts; \$4.00 per part or \$40 per set. Parts of interest to the highway and construction field include Part 1, Ferrous Metals Specifications; Part 2, Non-Ferrous Metals and Electronic Materials; Part 3, Methods of Testing Metals, except Chemical; Part 4, Cement, Concrete Mortars, Road Materials, Waterproofing, Soils; Part 5, Masonry Products, Ceramics, Thermal Insulation, Acoustical Materials, Building Constructions, Fire Tests; Part 7, Petroleum Products, Lubricants, Engine Tests.

Obtainable from the American Society for testing Materials, 1916 Race Street, Philadelphia 3, Pa.

BRAND NEW

THE LO TRIPLETS

WHAT YOU'VE WAITED FOR - THE LITTLE DEVIL TRIPLETS - THERE'S A CIRCULATING HOT OIL HEATER DESIGNED FOR YOUR PARTICULAR APPLICATION
• LOW-PRICED & HIGH PERFORMANCE • PLANT CAPACITIES 10 TO 40 TPH.

MEET LOA WHO WEIGHED
IN AT 2,250 POUNDS

MODEL LOA-26

ELECTRICALLY POWERED
AUTOMATIC HEATER CONTROLS
FUEL INPUT 6 GPH
LENGTH 88"
HEIGHT 76"
WIDTH 40"

MEET LOE WHO WEIGHED
IN AT 2,000 POUNDS

MODEL LOE-26

ELECTRIC DRIVEN
MANUALLY OPERATED
FUEL INPUT 2-6 GPH
LENGTH 78"
HEIGHT 76"
WIDTH 40"

MEET LOG WHO WEIGHED
IN AT 2,000 POUNDS

MODEL LOG-26

GASOLINE DRIVEN &
MANUALLY OPERATED
FUEL INPUT 2-6 GPH
LENGTH 76"
HEIGHT 76"
WIDTH 40"

Give either one
or all of us a call -
We're willing to go to work!



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MANUFACTURING COMPANY, INC.

• FACTORY AND MAIN PLANT
P.O. BOX 6105 • STATION 8
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• EASTERN DIVISION
P.O. BOX 4597
RICHMOND 25, VIRGINIA

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Lube Oil Booklet

The 6th Edition (January, 1961) of "Lubricating Oils for Industrial and Heavy-Duty Automotive Engines" is available from the Internal Combustion Engine Institute. Address: Charles G. Spice, Executive Secretary, Room 914, 201 North Wells Street, Chicago 6, Illinois.

This 75-page pocket-sized (5x7") booklet lists 750 oil companies and the brands of their oils which meet the test requirements of U.S. Military Specification MIL-L-2104A and/or British Defense Specification DEF/2101B, as well as the Supplement (S-1) and the Series 3 (Caterpillar) test specifications.

This list of commercially available oils has been compiled primarily as a service to the member companies of the ICEI, their distributors, dealers and customers. The booklet is available to the interested public at 35 cents per copy.

Continued on page 44



Geared by FULLER

The Hammersley Construction Company of Madison, Wisconsin is fulfilling its contract to move 2,500,000 yards of dirt in the construction of three Badger State highway interchanges with scrapers equipped entirely with Fuller Transmissions.

2½ Million Yards of Earth Moved by Fuller-Geared Scrapers

Hammersley Construction Company is heap-loading on fast work cycles with one Allis-Chalmers TS 360 geared by a Fuller 5-speed 5-G-1520 Transmission, eight LeTourneau-Westinghouse Model B Tournapulls—all geared by Fuller L-1550 10-Speed Transmissions—and seven Model C Tournapulls equipped with Fuller L-1220 Transmissions.

"We've used Fuller Transmissions in our scrapers for some time," states Fay Hammersley, Jr., owner of the company, "and we've had good results with them. On any new equipment, I'll specify Fuller."

Models 5-G-1520, L-1220, and L-1550 Transmissions are equipped with air-powered Countershaft Inertia Brakes for quick up-shifts, and

with Fuller Pressure Lubrication and Filtration Systems to provide positive lubrication, maintain clean oil, and greatly prolong gear and bearing life.

For easier, quicker shifts with engines operating in the peak horsepower range, lower fuel consumption, and GREATER PROFITS in your earth-moving operations . . . specify Fuller Transmissions.

FULLER TRANSMISSION DIVISION
EATON MANUFACTURING COMPANY 
KALAMAZOO, MICHIGAN

Sales & Service: West. Dist. Branch, Oakland 6, Cal. • Southwest Dist. Office, Tulsa 3, Okla. • Automotive Products Co., Ltd., Brock House, Langham St., London W.1, England, European Rep.

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ROADS AND STREETS, July, 1961

43

New Publications

Continued from page 42

PILE FOUNDATIONS (2ND EDITION). By Robert D. Chellis, Structural Engineer, Stone & Webster Engineering Corporation. 683 pages plus index; 246 illus., 6x9; \$16.00. McGraw-Hill Book Company, 330 West 42nd Street, New York 36, N. Y.

A comprehensive presentation of essential facts and data needed for economical and efficient design and handling of pile foundations. It

makes readily available to engineers, architects, and contractors much practical information on all phases of the theory, design, installation, maintenance, and repair of pile foundations—giving numerous aids to overcome the variety of problems in pile design and driving.

Among the subjects covered are the principles of soil mechanics; methods of determining pile capa-

cities from driving resistance; and choosing piles and types of pile-driving equipment. The author describes and evaluates types of wood, concrete and steel piles and sheet piling, and gives methods for structural design of piles, preventing corrosion of steel piles, protecting concrete piles, and load testing. He also gives considerable attention to the causes, methods of prevention, and remedies for pile foundation failures and to developments in diesel hammers, prestressed concrete piles, and sand drainage.

PRESENT AND FUTURE RESEARCH IN ASPHALT MATERIALS AND USES. By John Griffith, Director of Research and Development, The Asphalt Institute, College Park, Maryland. No. 116 in the Institute's Information Series, free on request. A reprint of an informative paper given at the 6th annual convention of the National Bituminous Concrete Association, at Houston, January 28-February 1, 1961.

ENGINEERING FUNDAMENTALS FOR PROFESSIONAL ENGINEERS' EXAMINATIONS. By Lloyd M. Polentz, P.E., Consulting Engineer; Instructor, Engineering Fundamentals, University of California Extension Division. 360 pages plus index; 327 illus. 5 3/4 x 8. Price \$9.50. McGraw-Hill Book Company, 330 West 42nd St., New York 36, N. Y.

CALCIUM CHLORIDE FOR STABILIZATION OF BASES AND WEARING COURSES. Manual SM-1. Calcium Chloride Institute, 909 Ring Building, Washington 6, D. C. Single copies free on request. Written for highway engineers, contractors, and material suppliers; deals with properties, design, types and methods of construction, and specifications; gives recommendations based on field application and laboratory research.

FOUNDATIONS. A. L. Little. Edward Arnold (Publishers) Ltd., 41 Madison Street, London, W. 1. 364 pages. 100s., \$14.

Subject matter covers deep and shallow foundations and much of the text is concerned with case records.



What gives you confidence in a company? One answer is speed. And The Fund, with offices networking the nation, is geared for prompt, accurate service, geared to deliver all your insurance needs, including Construction Bonds, Workmen's Compensation, Public Liability, Crime and Builder's Risk. By servicing your total account, The Fund can often save you money, lower your bid. Ask your insurance agent or broker to insure through The Fund of Experience.

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110 WILLIAM STREET, NEW YORK
Branch Offices in Principal Cities in America



POWER

REASONS

WHY GMCs ARE THE
MOST ADVANCED
CONSTRUCTION
TRUCKS IN 20 YEARS



PULL 

GMC V-8 DIESEL



You get rugged, compact
more inside cab room
short BBC dimensions—
carry bonus payloads
smoother power,

EXCLUSIVE ECONOMY RANGE GOVERNOR



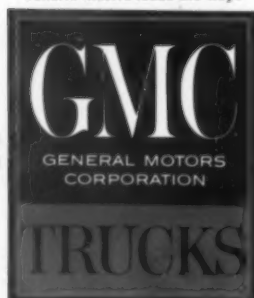
Only G
have th
range
positive
engine
most eff
top fuel
longer
Standard
on 4-w

● Greatest combustion efficiency with maximum air
performance than naturally aspirated engines ● Save
exclusive automatic hydraulic fan ● Four exhaust
complete exhaust scavenging, give a cooler-running
plete fuel combustion ● Replaceable dry-type cyl

THE TRUCK TRIUMPHS OF THE 60's!

GMC Truck & Coach—a General Motors Division—Pontiac, Michigan

From ½-ton to 60-ton
General Motors leads the way!



← 218 hp. V-8 Diesel Engine
Out In The Open with the
Other features of GMC st
are: 72" BBC and 52" fron
tion for big loads; biggest s
you can get; sharper turn
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lbs. GVW to 76,800 lbs. GC

GMC's Biggest, Diesel
60-ton Tractor—DBW9
with 90" BBC and 28-inch
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SHORTEST, LIGHTEST AND LEAST EXPENSIVE TO OWN—IN THEIR CLASS!

compact construction . . . many inches shorter for
room, simpler servicing and full advantage of
—lightest weight, up to 530 pounds less, to
—two-cycle design for faster acceleration,
power, exceptional fuel economy and added life.

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ve this economy
nge governor that
tively regulates
gine speed at the
ost efficient rpm for
p fuel economy and
nger engine life.
andard equipment
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**BIG PULLING POWER!
HIGH PERFORMANCE!
6V-71 GMC TRUCK DIESELS**

MAX. TORQUE
604 @ 1200
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to
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Ratings are at sea level and 60°F.

m air intake from Roots-type blower ● Better high-altitude
● Save up to 5% on fuel, get up to 12 extra horsepower with
haust valves for each cylinder (not just 1 or 2) assure more
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e cylinder liners are leak-proof, quick and easy to service.

Engine Is Right

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front axle loca-
gest safety vision
turning angles;
power from 32,000
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8-inch front axle
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EXCLUSIVE GMC ENGINES ARE BUILT TO



Short, Stout Design! Low-Rpm Power! GMC V-6s have exclusive long-life strength. Deep-skirted block has extra-reinforcing ribs and structural superiority throughout. Full-power at low engine speed and shortest stroke of any comparable truck-built engines reduce power-robbing wear, add to greater fuel economy and provide the desired, higher performance.

Cooler-Running, Stronger, Bigger Valves... Everything For Longer Life!

1 Extra-long valve guides, integral with head, minimize stem exposure to burning gases and assure faster transfer of heat. **2** Positive rotation of both intake and exhaust valves (except 305A) give valves self-cleaning action to prevent sticking, pitting, warping, leaking and burning.

3 Valve stems are short and big diameter to practically eliminate distortion. Sodium-filled exhaust valves* more rapidly transmit damaging heat through the valve guides to the coolant. **4** Up to 176 gallons of coolant circulating every minute (over twice as much as many competitive engines) provide the flow necessary for life-prolonging heat transfer. **5** Hard, tough, special steel is used in the exhaust valve seat inserts of heavy-duty V-6 engines to withstand high temperatures and constant seating action. **6** Valve heads and ports are extremely large for better breathing. Special hard facing resists pitting, corrosion, fatigue and wear. **7** Wide bridge between valves provides added strength and big cooling areas for better heat dissipation. *(Except 305s)

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MODEL	GROSS TORQUE RANGE	MAX. HP.
305A	258-260 @ 1400-2200	150 @ 3600
305B	264-266 @ 1100-2000	150 @ 3600
305C & D	268-270 @ 1200-2100	165 @ 3800
351	308-312 @ 1400-2400	180 @ 3400
401	375-377 @ 1200-2000	210 @ 3400



Lower Maintenance Costs! Adjustments, repairs and replacements are easier and less costly with GMC engines. For example—spark plugs are conveniently located inside the V. Self-locking screws make valve lash adjustments a simple job. Most major parts are interchangeable between V-6 engine models, and several with Twin-Six engines. Expert service and all parts are readily available at GMC Truck Dealers located across the country.



Low Buying Cost! Low Owning Cost! That's the new GMC 105" BBC Conventional 6-wheelers with 105" BBC cab, 351 or 401 V-6s. Servicing is convenient with wide hood and roomy engine compartment. Easy-in-and-out conventional cab trucks start with choice of 34 pickup combinations and go up to 60,000 lbs. GCW tractors.



Out-Earns, Out-Pulls All Trucks in Its Class . . . GMC steel tilt-cabs with exclusive 275 hp. Twin-Six. These easy-to-service, easy-to-drive models with 72" BBC and 52" front axle placement are also available with GMC V-6 engines. Full line, 19,500 lbs. GVW to 76,800 lbs. GCW, cannot be surpassed on any construction haul.

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OUT-LAST, OUT-POWER OTHER GAS ENGINES!

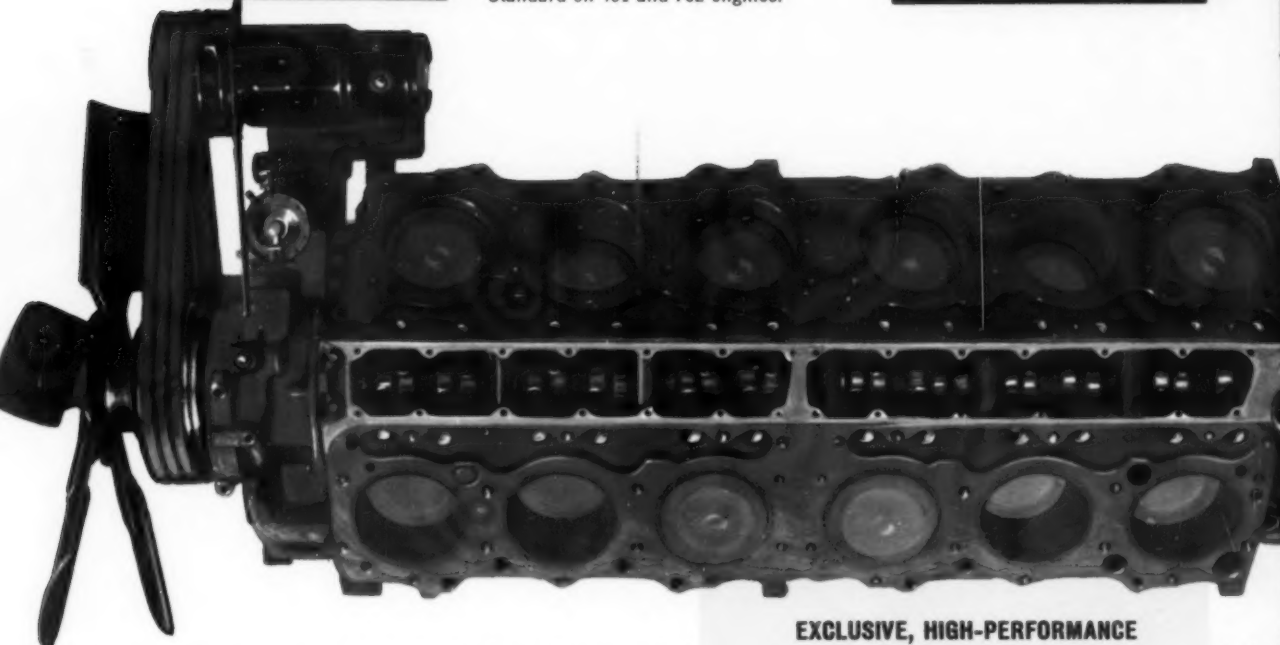
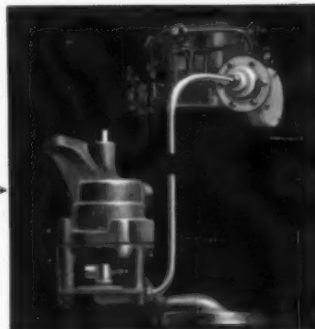


Greatest Pulling Power Of All! This 702 cu. in. Twin-Six gas engine produces the most usable power of any standard equipment engine. You get great reserve power at low engine speed to haul loads at part throttle under normal conditions . . . using reserve only for hills. You save fuel, reduce shifting up to 60% and get longer engine life.



← **Notice The Full 3-Inch Extended GMC Skirt** for the most rigid, full crankshaft support. New compact design, extra strong inner ribbing and staggered cylinders all increase strength and rigidity, decrease costly wear and failures.

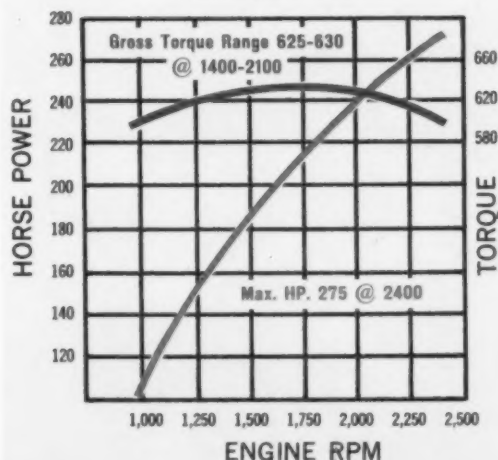
Tamper-Proof, Positive Speed Control Governor! This GMC patented hydraulic governor operates by direct oil pump pressure to accurately, reliably control proper operating speeds . . . adds to engine life. Standard on 401 and 702 engines.



Exclusive V-8 Power is standard in medium-heavy duty 90" Conventions along with easy-driving independent front suspension and easy-riding vari-rate rear springs on 4-wheel models. Ruggedly reinforced cabs with double-walls stand up on the roughest construction jobs. Heavy-duty models have the powerful Twin-Six.

SIT ANY CONTRACTORS USING NEW GMC TRUCKS.

EXCLUSIVE, HIGH-PERFORMANCE GMC TWIN-SIX



Good Contractors an Asset In the British Road Program

By Harold J. McKeever

Editor-in-Chief

London, July 1—This observer has just had the enlightening experience of seeing some of the new British Motorway projects. With 122 miles of these super-roads open, and another 75 miles under contract after a slow beginning, the Motorway idea is beginning to capture the imagination of the British. The people meanwhile are stepping up automobile ownership and use at a fast rate in these times of national prosperity.

The largest of the projects seen with camera and notebook is known as M.6. It is a 27-mile segment of the Birmingham-to-Preston Motorway. It will be a dual road with 70 major structures, mostly grade separations ("fly-overs" they're called here). All four contract segments offered were taken by a single firm, the very large company known as John Laing & Sons Limited. With only 23 months allowed for completing the job, this company is capitalizing on its long and varied experience and large resources. Particularly it is making good use of the knowledge it gained as the principal contractor on the initial Motorway segment, M.1, where the firm had 52 miles.

Several quick points of observation made their way in our notebook from these days in Britain.

One is that this country which has been the scene of vast schemes of government socialization of industry, mostly now abandoned, turned unhesitatingly to private contractors when the big Motorway program was conceived. Such firms as Laing and also Cubitts-Fitspatrick-Shand (now constructing the Hyde Park grade separation scheme, London's biggest traffic relief project) have grown to great size and skill in helping rebuild London and other bomb-ravaged cities since the War. The administrative ability is epitomized by Laing's capable handling of its large motorway projects, where mechanized methods are being used on a big scale.

A second point of interest is the care with which the Ministry of Transport, which corresponds rough-

ly to the U. S. Bureau of Public Roads, selects its contractors. In cooperation with the County Councils, the problem has been to pick contractors who have something to offer besides the lowest bid. On a federally-awarded "fly-over" project in London, for example, the lowest bidder turned out to be a fellow to have less than the desired record for doing work on time. Using a discretion allowed of it by law, the Ministry gave the job to the next lowest bidder.

"But," we asked, "doesn't this make the Ministry open to suspicion?" The answer: everything hinges on a Minister who has the public's confidence. The present Minister of Transport, Mr. Ernest Marples, would seem to have this confidence. He is a former successful contractor who, in accordance with British custom and requirement, gave up his private interests upon seeking a career in public office.

A third observation is that such men as Marples, in Britain as in the United States, are not found every day, and their value often is very great in carrying through large government programs requiring public understanding and support.

The fourth observation comes from visiting a Motorway job during the earthmoving and preliminary base work stage. This is on the universal need for highway technology to be carried out properly in the field, with the fullest understanding of what it takes to insure quality work from station to station and from hour to hour.

On some parts of this particular job the earth was being placed and covered with much less concern over uniformity of compaction and moisture control than has been found essential in U. S. highway practice. One project had no rollers whatever, the contractor being allowed to secure compaction merely by placing fine-grained soil in two-foot lifts and routing his equipment over it.

Continued on page 80



"I" Grading Job:

Dune Sand Was The Villain

By James R. Cummings
Associate Editor

"Toughest job I ever was on . . ."

This came not only from the project superintendent but also from equipment operators who were 20-year veterans of earthmoving work.

Target of these superlatives was Holloway Construction Company's 7.8-mile, \$3.6-million grading project on I-94 through the dune country below St. Joseph, Michigan. This was a running battle against dune sand and winter weather. The successful maintenance of a schedule was due to grade-A job management, centered in multi-purpose use of key equipment.

Principal items in the contract were 3,498,670 cu. yd. of roadway excavation and fill (the average haul being about a mile), and 433,200 cu. yd. of gravel for subbase and shoulder.

The job was awarded in June, 1960. Because almost all of the haul areas consisted of fine dune sand, Holloway scheduled the earthmoving phase for the winter ahead so as to gain the advantage of frost "stabilization" for his scraper fleet. But consistent



An example of the tough haul conditions on Holloway Construction Company's Interstate 94 contract near St. Joseph, Michigan. Not only are loaded scrapers, at left, stuck on the haul path but an empty unit returning to the borrow pit also needs a boost from a rubber-tired dozer.

stretches of cold weather failed to materialize. By late winter, operations were being plagued by haul conditions which stalled even empty scrapers, and rendered more than one borrow pit inaccessible. However, because of top production achieved from November through January, when weather and ground conditions were most favorable, the company was set to finish on schedule this August 1.

Approximately 75 percent of this sand assayed very clean yet very fine with particle size falling chiefly between the No. 50 and No. 100 sieves. Like most dune sand, the particles were uniform in size, with little if any interlocking of particles. The sand "fell away" under weight, thus making compaction difficult and reducing traction, particularly for rubber-tired equipment. The incoherent nature of the material, together with the steep slopes in the area, hampered the use of wheeled scraper equipment from the beginning.

Holloway's first exposure to these conditions came

during the clearing work done in the summer of 1960. The sand eased the removal of trees and stumps but the difficulty came in getting at them. Many of the hills were too steep to permit bringing a crawler dozer back up a pioneered slope. So two techniques were followed: stumps and smaller trees were hit on the way down and taken out in one sweep, and the larger trees were pulled out from the bottom by cable.

To travel back over a cleared section, the crawler dozers either had to negotiate a path through the brush beyond the right-of-way. Or, when possible, the operators worked their way diagonally back up a slope.

Grading for the two 36-ft. roadways began in November, 1960, with 25—yes, 25—Caterpillar DW21 scrapers plus two LeTourneau-Westinghouse B scrapers. Cuts through the dunes ran as deep as 92 ft. and provided about 60 percent of the fill material. The rest was obtained from four borrow pits. Scraper production reached as high as 28,000 cu. yd. per 2-shift day



The new highway penetrates the dune country bordering Lake Michigan. The area shown here, almost at grade, is awaiting placement of the 3-in. compacted gravel subbase course.

during the "good" period lasting through January. Average haul during this period was about 2000 ft. one way.

According to Francis J. (Bud) Morrell, Holloway's general superintendent, the most critical cost problem on this job was the movement of material to and through the fill site. Scrapers had to be pushed out of the borrow area onto the haul path, pushed through the dumping cycle and onto the return path and even during the periods of best production they often had to be pushed along the haul roads.

The contractor brought in four rubber-tired tractor dozers to provide the mobile pusher assistance needed. These 57,000-lb. Michigan 280s pushed scrapers through the fill area, spread the material, and used their speed, flotation and maneuverability, to work back and forth on the haul roads boosting stalled scrapers.

Not all of the excavation material was sand. On one 1½-mile section of the job, 120,000 cu. yd. of muck was removed by a 3½ cu. yd. Link-Belt Speeder 60S dragline. This swampy material lay only 3 to 4 ft. deep and was handled easily. Sand backfill was dozed in right behind the dragline to accommodate scraper traffic as soon as possible.

The Holloway company, as previously mentioned, had hoped that winter would bring a freezing of moisture and crusting or stiffening of the sand. But the weather's mildness was such that the deepest frost penetration was only about 6 to 8 in.—not enough to back Holloway's bet. Thus the principal problem toward the latter stages of this job was gaining stable haul roads. After a snowfall, a motor grader was used

at times to blade snow into the ground in an effort to stimulate freezing subsoil conditions—even artificially. At other times, sandy topsoil and muck were brought in to get body into the haul roads.

Conditions during these times were a threat to the blood pressure of Morrell and his operators. The roads were not bladed because the scraper operators found that the best chance at a "compacted" path lay in following the wheel ruts already made. Still, while following these tracks, loaded units on a 1-mile haul were stalled as many as five times.

The wheeled dozers had a busy time. While two of them helped scrapers through the fill area and spread the sand, two others sped back and forth on the haul path keeping the line of scrapers moving.

The sand, on these occasions, was "like sugar," as a scraper operator observed. Even while on the path and following the "compacted" tracks, the drive wheels of the scrapers' prime movers could be seen pushing sand out in the back; the rear wheels, holding most of the weight, piled the sand up in front of the tires. Scraper tire pressure was maintained at a normal 45 psi; a change of tread design also would have made little difference under these conditions, it was said.

On a few occasions when haul conditions were at their worst, the contractor was using as few as nine of his rubber-tired scraper fleet. To use a greater number would have resulted in that much more clogging of the haul road, said Morrell.

To stay on top of the job while contending with such conditions, the contractor kept men and equipment working at top speed on other parts of the con-

Continued on page 95

Approaches for Evaluating Cost Information

Part II—Methods for Comparative Analysis

By James P. apRoberts

Cost Control Specialist and Chief Estimator
La Canada, California

This series of articles has been created under the sponsorship of **ROADS AND STREETS** for a very basic purpose: to present a practical discussion of the several aspects of Cost Controls, as they may be applied to evaluating the daily operations of a typical roadbuilding contractor. Each of these articles have produced a number of serious inquiries regarding the application of some phase of cost control work to certain of the managerial problems of roadbuilders. Such inquiries are indeed welcomed. As time permits, they are being answered.

Earlier topics discussed in this series covered the value of cost control methods in general to a roadbuilder; the importance of maintaining a close relationship between acquiring data (as in Timekeeping), and reporting it (as in the Accounting function); and then analyzing actual field costs.

With this background, article No. 7 which made its appearance in February **ROADS AND STREETS** served as an introduction to the techniques of analyzing and reporting on such cost data.

It covered the overall analysis of

costs by means of periodic reports of the following types—Balance Sheets, Profit and Loss Statements and Ratio Analyses. Each of these are usually issued at monthly intervals.

It was noted in this Seventh article that the purpose of a Balance Sheet is to show the current financial status of a contractor in terms of his Assets and Liabilities. On the other hand, the aim of a Profit and Loss Statement is to present to the Contractor a direct statement of his sources of Income and Expense.

The relationship between the several items on these statements may be studied by means of making either a Ratio Analysis or a Comparative Analysis. The first mentioned—Ratio Analysis—is applied for the evaluation of current cost or income, with or without respect to a firm's assets. The second type of analysis represents the study of changes made between two or more sets of statements.

Various Kinds of Ratios

In making either type of study the same three classes of ratios are employed—(1) Balance Sheet Ratios, (2) Operating Ratios and (3)

Balance Sheet versus Profit and Loss Statement Ratios.

The purpose of the present article is to consider how either or both of these methods may be used to examine the financial records of a typical roadbuilding contractor over a significant period of time.

We shall begin our discussion by assuming that the highly mythical construction company known as "U. & I. Roadbuilders, Inc." was actively engaged in a wide variety of enterprises related to highway construction for all of 1960. Its financial records for this period are now available. By studying them we may be able to get a better insight into the strong and weak parts of its operation.

The last published (February) article included this company's Balance Sheets for the month of October 1960. Consequently, those Balance Sheets have now been enlarged to show entries for November and December as well as for that month.

By the same token, a second statement of Profit and Loss for the second half of 1960 has been combined with the original one which covered only the first six

Continued on page 121

Showing fine grading in final stages. Grader-roller team doing last-minute work ahead of the subgrader. Roller and sprinkler seen in rear. Note how the conveyor belt was positioned to load excess material into trucks between the rails. →

Good 'Up Front' Control Marked This Paving Job

The slogan "It's what's up front that counts," heard in the cigarette ads, is an apt one for today's paving jobs. The forward work before the paver comes along—once done perfunctorily—is known now to be of extreme importance, whatever the kind of paving being laid.

A project which reflects the new alertness to the importance of subgrade and base quality is here pictured and described. It is a segment of I-80 just north of Des Moines, Iowa, completed during the 1960 season. At the time it was awarded in August of 1959 the hue and cry from Washington over the quality of highway work hadn't reached its peak. But the Iowa Highway Commission had long since embedded some thorough-going quality requirements into its designs and specifications for grade preparation and base course construction.

As in most other states the engineers in Iowa, as well as the contractors, have proved that it is about as economical to "do it well" as to skimp on this phase.

The \$2.3 million paving project on I-80 was taken in 1959 by one of Iowa's leading contractors, Cameron, Joyce & Co., of Keokuk. The work took in 5.6 dual miles, comprising 217,500 sq. yd. of 10" x 24' standard reinforced concrete for main lanes and 63,000 sq. yd. of unreinforced concrete on ramp lanes, plus related work. Because all the spotlight was already on quality for Interstate highway work, all job factors were reviewed with special care, and the engineers prepared their proposal with the aim of getting a low-bidder having unquestioned ability to do quality work and keep on schedule.

As to the schedule, this was a story in itself. The grading contractor, R. B. Burch, was 97 percent done by June, 1959, and planning to move out. However, 40,000 cu. yd. remained, and this yardage needed to be cleaned up to give Cameron, Joyce access along the full project length. Due to unprecedented wet weather all through 1959 and into the next summer, grading was *still not completed in June, 1960!* This delay and the wet conditions inevitably affected the paving

job management. Cameron-Joyce was unable to start in 1959. This was due not only to weather and grading interference but also to the steel strike which caught the company short of mesh. With a late start the following spring, still due to weather, the firm as of July 1, 1960, had done only 10 percent of a normal seasonal volume on this job.

Roads and Streets singled out Cameron-Joyce's job late in 1960 summer, when it had finally gotten into high gear, because of the firm's excellent reputation for good equipment, efficient work and quality cooperation.

The paving job was organized around an "up front" foreman on shaping of grade, a base foreman, a paving foreman, a batch plant foreman, and a batch truck supervisor, all under a superintendent.

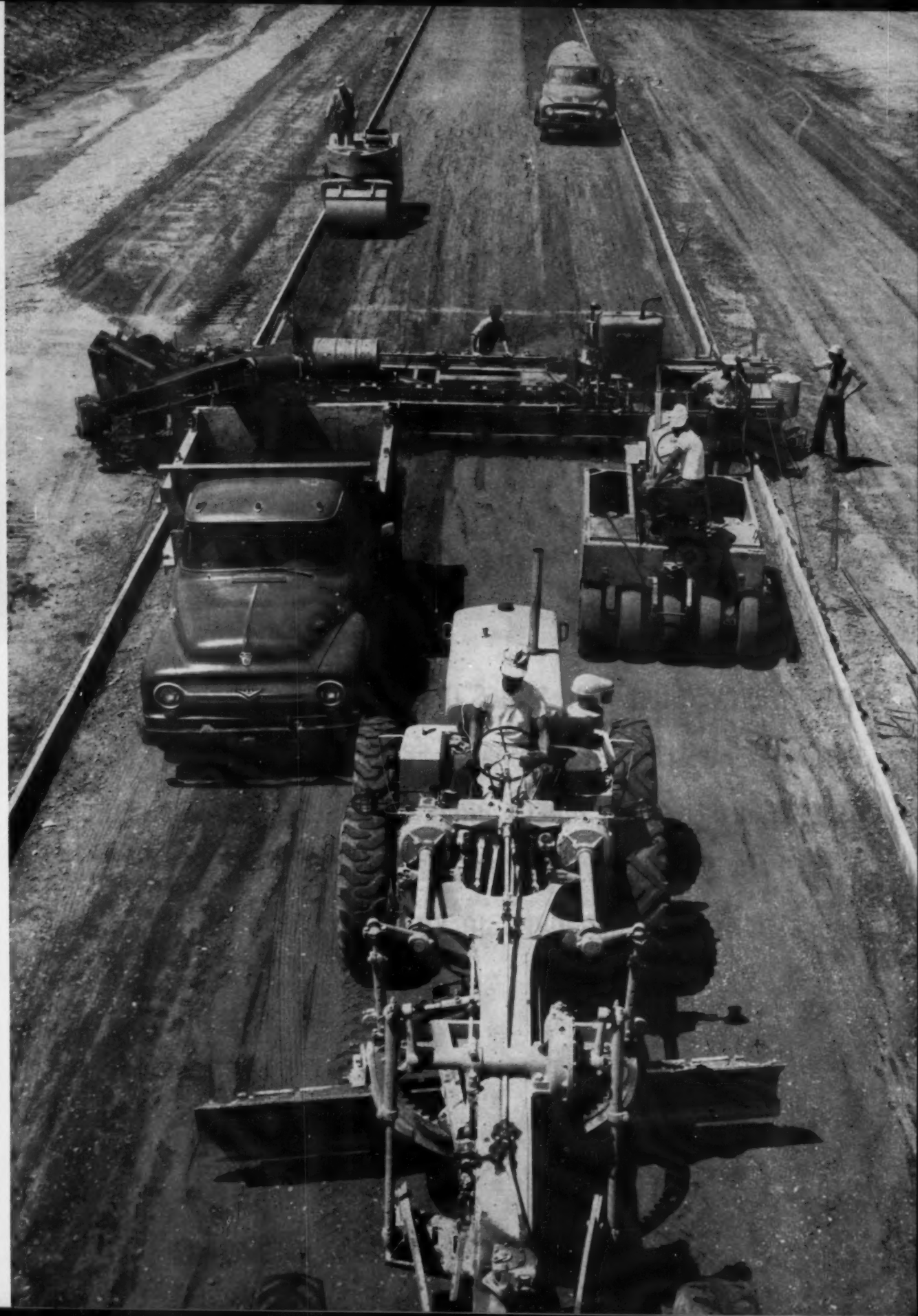
The first job operation was the requirement that the prepared subgrade left by the grading contractor be reprocessed. Experience has proven, according to Iowa engineers, that a subgrade of uniform depth is essential in order to provide a stable area on which to place the sub-base material and the forms, which in turn is reflected in better riding characteristics of the finished pavement. In addition, a subgrade of uniform density and depth minimizes differential settlement and increases the structural adequacy of the pavement; hence, the requirement that the subgrade be scarified and recompacted to a uniform depth of 6 in. The requirement was of particular importance on this job due to the extended period during which the subgrade is exposed to the elements.

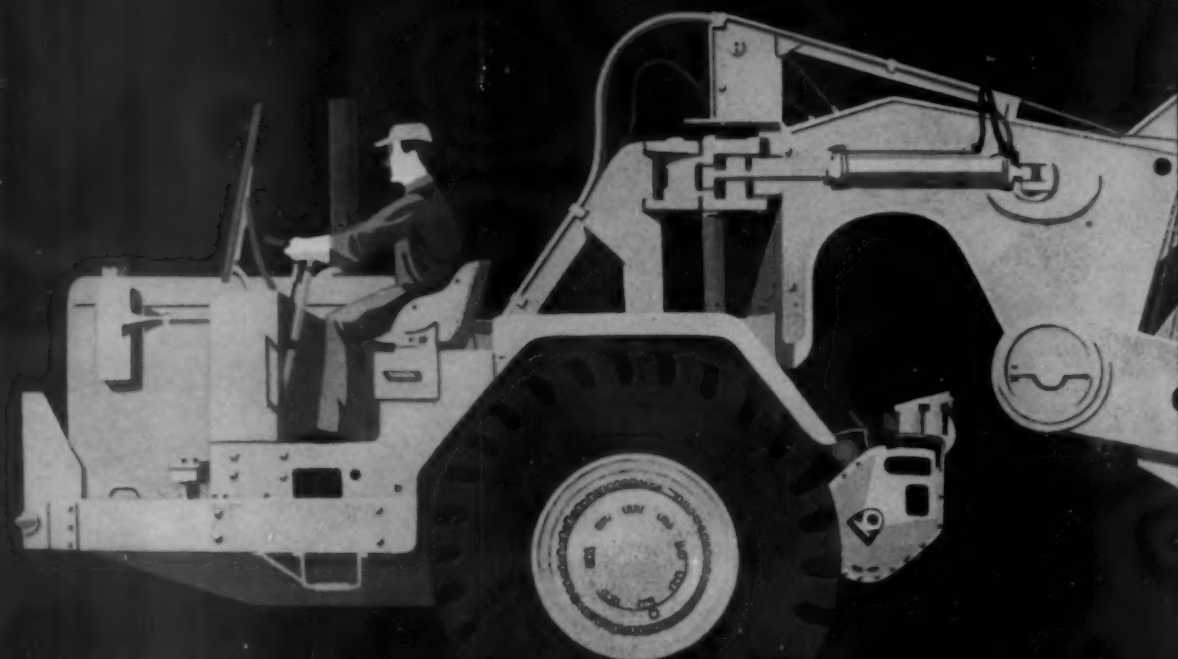
The subgrade preparation was done in several steps, worked out from Cameron-Joyce's experience on similar Iowa projects.

First, blue tops were set at every 50 ft., offset 3 ft. from the slab edge.

Second, the subgrade was dressed with a motor grader and elevations checked to determine any excess or deficiency of material from station to station, in relation to a final true grade.

Continued on page 112





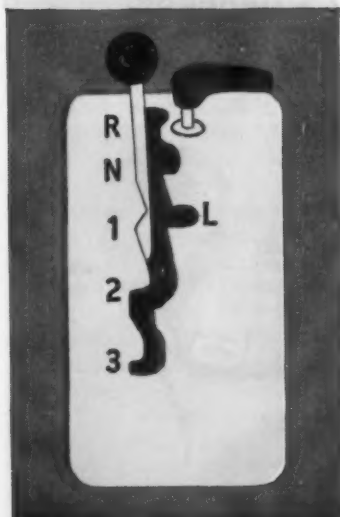
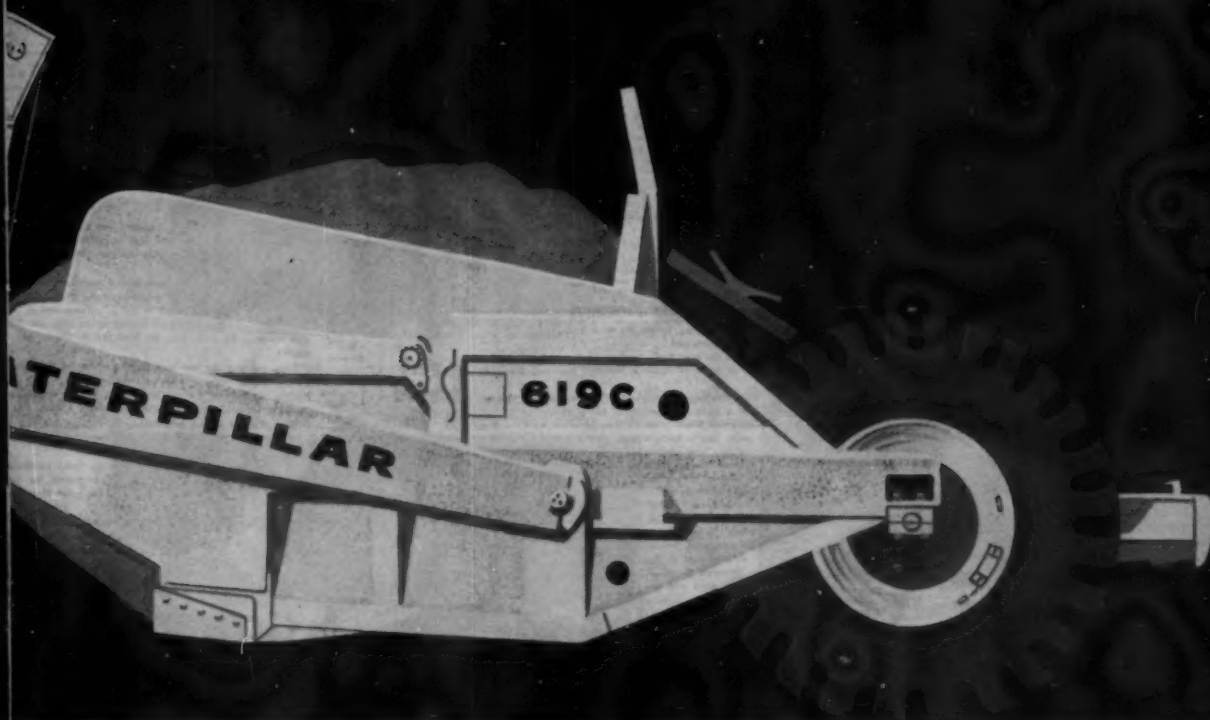
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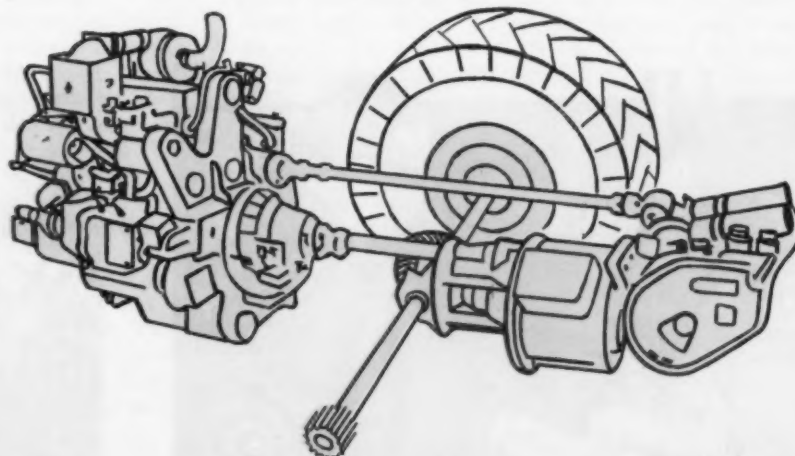
**ADVANCED AS TOMORROW
—CERTAIN AS YESTERDAY**



New 280 HP 619C offers choice of power shift transmission for faster, easier operation or direct drive transmission. Air actuated, live power cable control reduces operator effort. New, bigger 26.5 x 29 (22 ply) tires improve roadability. Top speed: 30 MPH. Capacity of matching Lowbowl scraper: 18 cu. yd. heaped, 14 cu. yd. struck. Also available: 25 ton PR619 Rear Dump Trailer built by Athey Products Corp.

New power shift transmission provides 9 speeds forward with just 3 shifts. One lever gives operator instant selection of 3 speed ranges... dial indicator tells him when to shift. Within each speed range, transmission **automatically** shifts to torque divider drive, direct drive or overdrive to match job conditions. The 619C with power shift transmission always operates at the right speed and power for the job at hand.

New, more powerful Cat D340 Engine (280 HP maximum, 250 HP flywheel at 1900 RPM). This economical 4-cylinder engine burns No. 2 fuel oil... has parallel-ported dual intake and exhaust valves and overhead camshafts for most efficient operation... has pressure ratio controlled turbocharger and aftercooler. Swingaway dash and pivoted crankcase guard simplify servicing. Unit construction assures easy servicing: engine, transmission, planetary final drives can be removed without disturbing adjacent components.



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Challenge to Grayson

Texas National Highway Week slated May 21-27

APRIL 21 — Approaches to the highway system of Texas observe Highway Week (May 21-27) on the state for the first time.

Even As We Build Roads, More Roads Are Needed



WARD IN TEXAS
-27 Designat
al Highway

APRIL 21 — Approaches to the highway system of Texas observe Highway Week (May 21-27) on the state for the first time.

Texas National Highway Week Is Scheduled For May 21-27

AUSTIN, Texas — Approaches to the highway system of Texas observe Highway Week (May 21-27) on the state for the first time.

State Highway Engineer D. C. Greer said the highway system of Texas is in a "critical condition" and that more roads are needed.

Texas Highway System Outmoded, Says Engineer

AUSTIN, Texas — The highway system of Texas is "outmoded" and "inadequate" for the needs of the state, State Highway Engineer D. C. Greer said today.

Greer said the highway system of Texas is in a "critical condition" and that more roads are needed.

Greer said the highway system of Texas is in a "critical condition" and that more roads are needed.

End-Buggy Highways

Greer said the highway system of Texas is in a "critical condition" and that more roads are needed.

By Week Observed 1st - 27th

Greer said the highway system of Texas is in a "critical condition" and that more roads are needed.

Traffic Deluge

Greer said the highway system of Texas is in a "critical condition" and that more roads are needed.



Old Road Must Go Says Greer

Greer said the highway system of Texas is in a "critical condition" and that more roads are needed.



Officials and Industry Teamwork Turns National Publicity Program Into "Smash Success"



Highway Week

In hundreds of communities across the U. S. last month, groups of school children trooped through highway department maintenance sheds; newspaper reporters tramped through the spring mud on highway construction projects; and governors—flanked by pretty girls with white gloves—cut ribbons to open new stretches of Interstate road.

Chamber of commerce businessmen heard state highway officials preview plans for highway progress in 1961. Huge audiences of housewives saw local highway officials interviewed by favorite radio and television personalities. And shoppers on many a small-town Main Street paused to look at bank window exhibits illustrating highway needs and benefits.

This is how the highway fraternity celebrated the first "National Highway Week." It came off better than even the most optimistic industry leader had hoped.

President Kennedy, following the recommendations of a Congressional resolution, kicked off the big event with an official proclamation. Highways, he said, are vital to the national economy and the American family "way of life!" and during the week of May 21-27 should be a subject of appropriate public attention.

In almost every state in the Union, the governor followed with either a state proclamation or a supporting statement. And finally, in scores of cities, mayors set aside the week for special consideration of local highway needs and benefits.

With this official blessing, state highway departments and "better highways" organizations touched off a series of special projects designed to publicize their local highway programs and the good work of the road-building industry.

Variety was the order of the day. Here was what happened in a few states:

Connecticut produced an elaborate press kit to break into the public press with all kinds of information on programs and progress, arranged special luncheons, and set up a number of exhibits.

In *Iowa*, where one of the most comprehensive programs was launched, "name" journalists wrote editorials and articles, the public flocked to "open house" at each of the district offices, downtown merchants joined highway officials and contractors in dedicating new sections of highway, and school children wrote essays on importance of good roads.

In *Kansas*, 75 civic clubs in 40 cities heard speakers provided by the highway department and state Chamber of Commerce.

The state highway department and the Good Roads Federation in *Michigan* staged a whole series of special events to call attention to Highway Week. They named all of their roadside parks during the week, (for former state highway commissioners) buried a time capsule on Interstate 94, dedicated a new main-

tenance garage, held a \$22-million contract letting, and set up a special 20th anniversary celebration of an historic Detroit project.

Missouri highway leaders arranged press tours on four new Interstate routes; and in the districts, engineers left their desks to visit newspaper offices with local story material.

The governor in *New Hampshire* (as did his counterparts in other states) went on the air to describe the impact of new highways on the state's economy. The contractors' organization put up the cost of a special statement from the highway commissioner, which subsequently was broadcast by 23 radio stations in this small state. The AGC also developed a half-page advertisement on highway needs and paid for space to run it in a number of leading newspapers.

Rhode Island's campaign sparked by Public Information Chief John Q. Calista, touched all the bases. One radio station brought a parade of 18 state and federal officials to its microphones.

National highway leaders, U. S. Secretary of Commerce Luther Hodges and Federal Highway Administrator Rex Whitton, flew to *North Carolina* to participate in the dedication of a new section of Interstate System, an event that produced stories by the wire services and showing of news clips by several hundred radio stations around the country.

In *North Dakota*, district engineers in 10 major cities constructed displays and distributed highway week posters.

State legislators were guests at a gala Golden Anniversary dinner of the highway department in *Pennsylvania*, planned as the major event of the week. District offices held open houses here, also, drawing thousands of visitors.

The *Washington* state highway department and good roads association stimulated the mayors of 30 cities to make local highway week proclamations, and in 20 of these, committees planned publicity and special dinner meetings. Officials and industry leaders made more than 50 speeches to business and professional organizations, posted the highway theme on 40 billboards and placed stories in nearly 250 publications.

Nearly 16,000 bumper strips were carried by automobiles in *West Virginia* during the week, and scores of radio-TV stations carried the better highways message. Contractors raised \$1,500 to buy promotional materials.

Wisconsin newsmen and TV people were given a complete tour of major Interstate projects, later developed special programs around interviews with highway officials.

These are only a few of the projects the highway fraternity launched in these, and other states, cited here to illustrate the variety of promotional projects employed. A complete round-up would take pages.



"Open-House" one of many activities presented during "National Highway Week" to acquaint the public with highway needs and benefits.

Backstopping these efforts at the national level, the Better Highways Information Foundation ground out reams of publicity materials—suggested editorials, feature stories, posters, bumper strips, and other materials. A kit of spot announcements was sent to nearly 100 major stations, and 60 live interviews were arranged in 30 states (including an interview with Department of Commerce Secretary Luther Hodges on the Dave Garroway "Today" show).

BHIF also obtained endorsements of the "National Highway Week" theme from such national organizations as the National Safety Council, the AFL-CIO, the National Association of Manufacturers, and the International Association of Chiefs of Police, and the American Automobile Association.

In addition to developing kits of materials for use of state and local highway organizations and concentrating on radio-TV coverage, BHIF sparked a number of feature articles in major national publications. For example, *Parade* magazine, a Sunday supplement that goes into millions of American homes, was encouraged to launch a contest to locate the nation's most beautiful stretch of highway. Officials of BHIF, the garden clubs, the AAA and AASHO will be judges.

At the same time, a few leading industry organizations initiated individual projects to bolster the publicity drive. The Portland Cement Association ran advertisements in professional publications alerting media people to "National Highway Week." Caterpillar Tractor Company distributed BHIF promotional materials widely among its dealers and urged their participation in local events. Numerous contractors lent their private planes for aerial tours and contributed funds for luncheons and dinners.

The demand which the event generated for highway speakers extended down to the county and city level, and in many communities these local officials were given their first real opportunity in months to describe highway needs.

What was the impact of this first "National Highway Week"?

Industry leaders, naturally, are enthusiastic in their comments. After a long run of "bad press," it was good to see newsmen writing constructively and enthusiastically about highway programs. "Thousands of words were written about our highway program and scores of pictures taken," the Tennessee Road Builders Association reported.

A few state highway departments let the occasion slip by without capitalizing on its publicity potential, and the industry has not yet organized BHIF groups in every state capable of initiating local publicity programs. In states where such vacuums existed, nothing happened. Other states just went through the motions. In fully half, however, an aggressive campaign was mounted. And some of these went "all out." Here, the public information directors of the state highway departments and better highways associations distinguished themselves.

"The states that were organized and ready to get on the bandwagon created good will and public understanding which will help immensely to stabilize their highway programs," Ellis Armstrong, BHIF president believes.

There were holes in national press coverage. Congressional delegations were not brought into the act enough. The support of many interested civic and business organizations was not solicited.

In spite of these short-comings, however, the first "National Highway Week" celebration was, as one veteran state PR man put it, "probably the most intensive and successful promotion of highway needs and benefits we have seen in many years."

Thanks to such planning, the men, women, and children who visited highway shops, highway projects, highway exhibits, and highway dedications learned a lot about highways that they didn't know before—and they liked what they learned.

"Like its high production, dependability" *Eddie Givens, Sr.*

"Work 25% faster than other graders" *Eddie Givens, Jr.*

Both father and son of the Eddie Givens family head up their own earthmoving firms in Arizona. Eddie, Sr. specializes in road construction; Eddie, Jr. in irrigation. Each has his own job problems and equipment requirements. When it comes to graders, however, both agree LeTourneau-Westinghouse 660's are most profitable.

Givens Construction Co., Phoenix, considers its four LW 660 graders invaluable, both as production and maintenance tools. Building 8.4 miles of Interstate Rt. 18, near Tucson, for example, the 160-hp LW graders handle finish grading, level soil-cement windrows, mix oil and aggregate for road surfacing, and maintain all service and haul roads. Production per day for the firm averages 1 mile of subgrade plus the "blue-topping" of 2500 ft of 48-ft wide roadway.

Owner Eddie Givens, Sr., says, "I'm well satisfied with the '660's'... especially like its high production and dependability." Superintendent Richard Van Weelden adds, "The '660's' big moldboard, high horsepower, and fast reverse speed are a big help in giving us highest production."

Eddie Givens Ditching Co., Casa Grande, works two LW 660 graders, completes an average of 75 miles of irrigation ditch per year. Eddie Givens, Jr., says, "After three years of use, we've found that LW 660's work 25% faster than other graders. They give us the best grading results we've ever turned out. In addition, they travel fast enough for efficient job-to-job moves. This saves tying up a truck and driver, keeps them free for other use. And very important, '660's' give us no maintenance problems!"

We will be happy to show you a LeTourneau-Westinghouse grader in action so you can see how its many important advantages help you complete jobs faster, for bigger profit. There's a size LW grader to fit your every need, 85 to 190 hp. Ask for complete details.

G-2337-DCJ-1



LETOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

... for more details circle 334 on enclosed return postal card



Which is best for YOU? Elevating scraper...

▲ Replaced 3 trucks and a loader

On street grading project, Arcon Construction Co., Mora, Minn., had been using 4 machines — a front-end loader and 3 trucks — to move windrowed dirt. Production averaged about 768 yds in an 8-hr day. Arcon *upped* this to 864 yds for same period by switching to *one* machine — a LeTourneau-Westinghouse D Tournapull® with 10-yd Hancock elevating scraper. "It is 3 times faster than our other method of operation," reports Superintendent Rubin Wroolie, "and moves more dirt. It goes in and self-loads, hauls, spreads, does the entire job all by itself. Our Tournapull works under wet, soggy conditions where our trucks bog down."

▲ Self-loads in 45 to 75 seconds

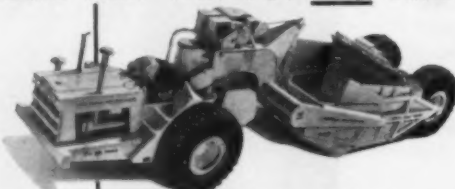
Irving Jensen Construction Co., of Sioux City, Iowa, used 143-hp D 'Pull-Hancock scraper combination with these results: It completed 5835-ft cycles in less than 10 minutes — *self-loaded* heavy, damp clay in 75 seconds — dry loose materials in 45 seconds. The job: grading streets in Coralville, Ia. "It works on its own," reports grade foreman Everett L. Givan, "frees our pusher for other work." As scraper cuts the earth, an electrically-driven slat-type elevator *pulverizes* the material, carries it *up* and back into the bowl — loads the last half yard as fast and easily as the first! Spread time: 5 to 10 seconds with positive load-ejection.

MORE LW PRODUCTS THAT WILL PUT YOU TIME AND MONEY AHEAD:



TOURNAROPES®

The flexible, short-lay wire rope that resists crushing or kinking. Sizes: $\frac{3}{8}$ to 2-inch dia. Lengths to 60,000 ft.



V-Power TOURNAPULLS

290-hp, 20-heaped-yd "C"...and big 430-hp, 29-yd "B". Top power/wt ratio and electric controls permit tandem scraper operation. Interchangeable 22 and 35-ton Rear-Dump bodies.



SPEEDPULL®

37.7-mph, 6-wheel "C". 276 hp. 20-yd Fullpak® scraper...40 yds in tandem. Hydrair® suspension eliminates axle and springs on front wheels...permits full 42° front-wheel turn.



....or conventional scraper? D 'Pull* has both

▲ Paver-ready cut in one pass

50 miles of "trench", 4 ft wide, 6 inches deep had to be cut next to pavement, to widen U.S. 16 near Farmington, Michigan. Above photo shows how Holloway Construction Co. handled the job with 2 D Tournapulls and a Tournatractor®. The 9-yd LW scrapers (fitted with special blades limiting cut to exact 4-ft width and 6-inch depth) dug the trench on a *one-pass* basis. And, with short 24-ft 3-inch turn-radius, the "D's" moved in and out of traffic-and-trench *fast*.

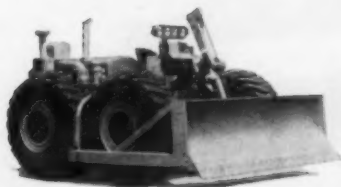
Choice of 10-yd Hancock elevating scraper or 9-yd LW scraper *doubles* the D Tournapull's value to *you* on production dirtmoving as well as on clean-up work. Both scrapers are interchangeable. And, with either one, you get *these* proven D 'Pull benefits: power-transfer differential, electric controls, kingpin power-steer, choice of power-shift or step-gear transmission, speeds up to 30 mph, and permit-free roadability. Remember, too, you can also use *two* LW 9-yd scrapers in tandem, or switch any time to 11-ton Rear-Dump. Worth looking into? You bet! Call us and see.



LETOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit



TOURNATRACTOR

The mobile LW tractor on rubber, with speeds to 18.5 mph, that handles 85% of your tractor jobs twice as fast as crawler tractors. 218 hp. Choice of electric or hydraulic blade control.



GRADERS

7 sizes from 85 to 190 hp, including 2 torque-converter POWER-Flow® models. Self-adjusting brakes standard equipment on all sizes. Full line of attachments inc. Preco "Dial-A-Slope" blade control.

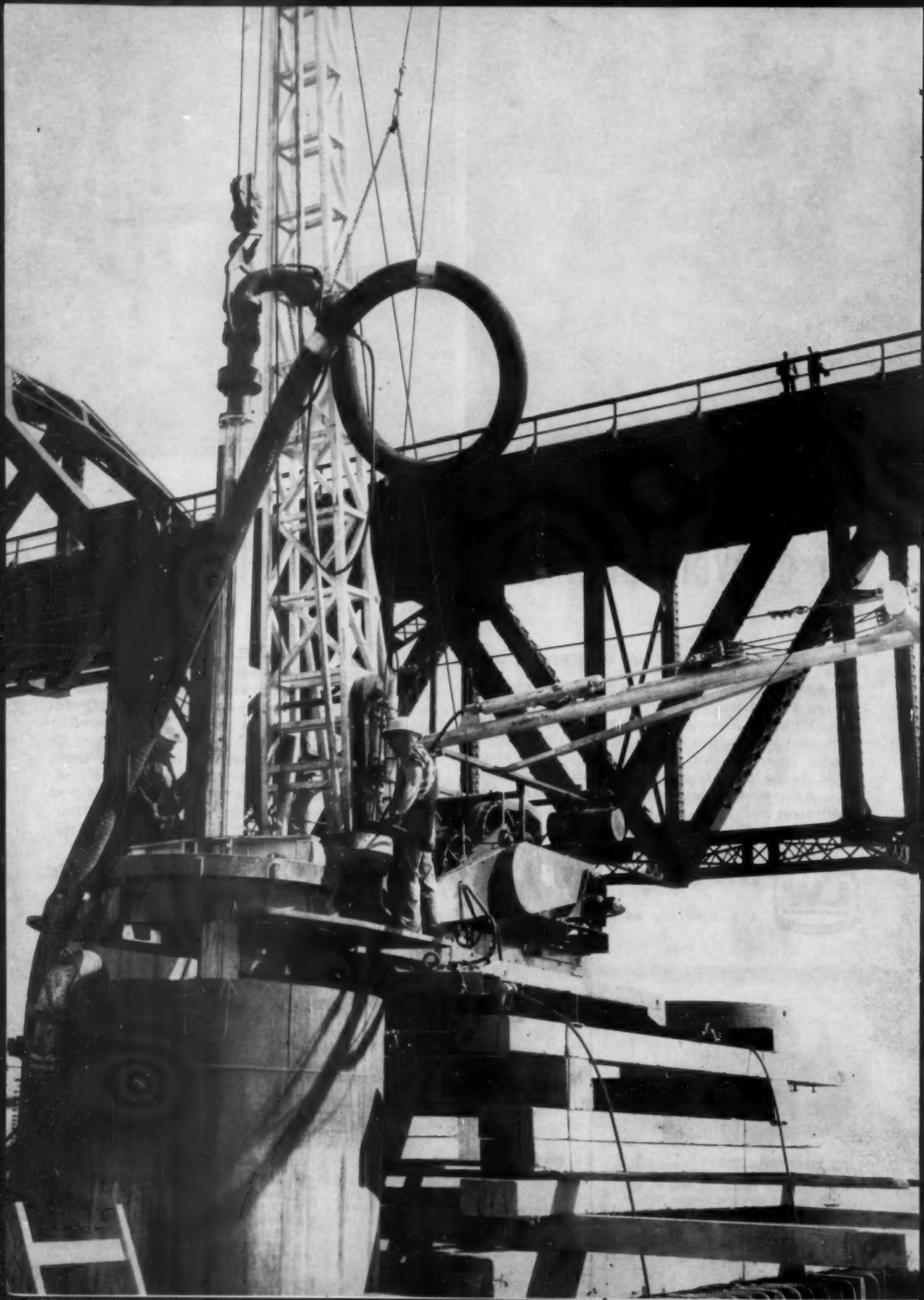


HAULPAKS®

The sensational LW truck designed to earth-moving (not automotive) "specs". 5 sizes, 22 to 60 tons...up to 550 hp. 90-ton bottom-dump available. Exclusive Hydrair suspension. Power-transfer differential.

*Trademark DPH-2428-DCJ-2

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A 72-in. steel caisson is in position and, through it, a boring rig is drilling down to and into bedrock for placing piles (see sketches 1, 2 and 3).



Floating Hollow Pier Footings Cut Bridge Job Cost

A unique cost-cutting method of bridge construction is being used by the Yuba Erectors Division, Yuba Consolidated Industries Inc., of San Francisco, in building the new \$14,000,000 Benicia-Martinez Bridge in Northern California.

Placement of a 90 ft., 17-ton steel girder atop concrete piers on the Martinez side started construction crews on the erection of the superstructure of the bridge which will replace the Carquinez Ferry, last of San Francisco Bay's once extensive fleet of ferry boats. A new Highway 21, a link in the Interstate highway system, will cross the bridge, which is part of an \$80,000,000 Carquinez Project which includes a recently completed second Carquinez Straits Bridge near Crockett.

Yuba Consolidated is contractor for both the \$5,769,000 substructure and the \$8,469,465 superstructure of the new bridge. Contracts are planned for new freeway approaches at each end, and all contracts will be timed for an official opening by late 1962.

The new 6,215 ft. long bridge will have a 62-ft., 4-lane divided roadway. It will be a high level structure (138 ft. navigation clearance) embodying seven trusses of 528 ft., two of 429 ft. and one of 330 ft. length, plus steel girder approach spans.

In building the substructure, a floating reinforced concrete box, 44' x 86' x 25' was cast on dry land, launched like a ship, and towed to the bridge site by tugs where it was anchored in place.

Then 6 ft. diameter steel caissons up to 143 ft. in length are being lowered through cells in the concrete box to the bottom of the Straits. Filled with concrete, the caissons will provide legs to support the box footings. The footings, in turn, are concrete filled to form the supports for the concrete piers.

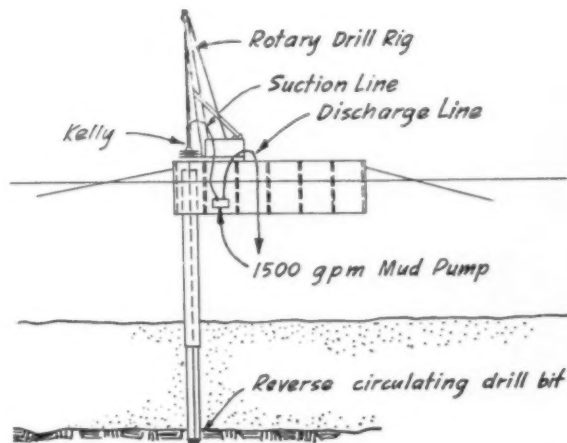
Each footing is partitioned into 18 cells, thus creating a buoyant "honeycomb" box. Ten of the cells have 84-in. steel pipe which extend from the bottom to well above the water line.

After the precast footing unit is securely anchored into final position, the 6 ft. diameter steel caissons are lowered through each of the ten steel pipe sleeves, and are then sunk to bedrock, 130 ft. below mean sea level.

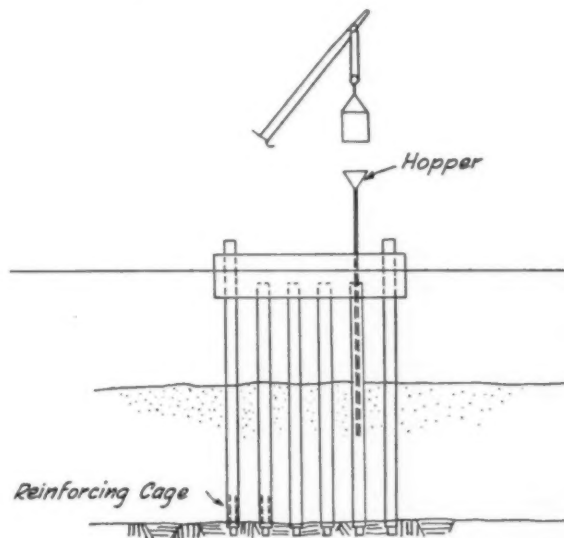
To sink the 6 ft. diameter steel caissons into bedrock, Yuba crews first lower into the water a temporary 80-in.-diameter casing. This is sunk into the water and sediment to a depth where the overburden is stiff enough to stand on a vertical plain when excavated.

The next steps are to lower a 78-in. rotary drill and air-lift pump into the temporary casing, and to drill

Continued on page 68



On arrival at the pier site by barge tow, the floating box is anchored in place by four to six 6-ton Danforth anchors. Then 80-in. temporary casings are placed, and through these a 78-in. drill is positioned and driven by a rotary drill. The drill bores into bedrock, an air-lift pump removing cuttings. A 62-in. drill then bores 5 ft. farther into rock. (FIG. 1)



The permanent 72-in. steel caissons are placed. The load of the floating box footing is now transferred to the four corner caissons. This is done by placing heavy steel beams with hanger rods across the corner caissons at high tide. As the tide goes out, the load of the concrete box footing comes to rest on the four caissons. The footings and pier are now ready for the concrete pour. (FIG. 2)



**The popular
Cedarapids Model 443
SENIOR
COMMANDER**

When the first Cedarapids Commander crushing and screening plant was designed, it was an immediate success for high-production, low-maintenance performance. Thousands upon thousands of tons later, the proven basic Commander design is still the most productive and profitable on the market. This is the design which has become the pattern for all portable front delivery tandem crusher plants in the new Cedarapids Commander Series line.

There's a profit-proved plant for your job in the NEW CEDARAPIDS COMMANDER SERIES OF PORTABLE AGGREGATE PLANTS

• Now it's easier than ever to select the portable aggregate plant YOU need. Cedarapids has combined its broad line of front delivery tandem crusher plants into one *Commander Series* of 18 versatile models (some with semi-electric drives), from the Model 111 Pitmaster Commander to the Model 667 Master Commander. Capacities range from 50 tons per hour to 700 tons per hour.

Each of the 18 models is tailored to your particular needs through engineered variations in component sizes and types which can be combined as you wish to meet specifications in your local conditions. And best of all . . . in the Commander Series you'll find the plant that matches your equipment budget. Your Cedarapids Dealer has the details . . . see him today.

Continual improvements in proven basic Commander design and components give you these profit benefits

• 100% portability for quick moves. Horizontal screen always in operating position; nothing to raise, lower or adjust for traveling. Permanently mounted conveyors with self-cleaning pulleys speed set-up time. Optional third axle for large models to meet highway load limitations.

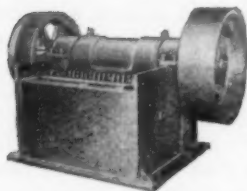
• High delivery discharge; no need to doze out driveway for big trucks.

• Easily accessible controls, centralized to

give operator complete control and full visibility of all operations.

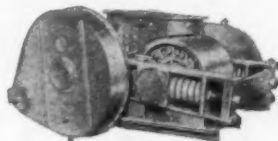
• Conveyors of the correct size and speed to handle high capacities without bottle-necks. Reinforced plant conveyor, self-cleaning pulleys, Iowa-built troughing rolls and idlers cut maintenance costs.

• Large, mono-rail return wheel easily handles high capacities. Adjustable paddles for handling different types of aggregate.



JAW CRUSHERS

Choose the size primary crusher you need, either Twin Jaw or Single Jaw types. Both have profit-boosting engineering improvements: Easy, simple hydraulic adjustment of discharge opening on large crusher sizes; heavy-duty pitman and side bearings set close together to prevent strain; extra-heavy eccentric shaft; extra-heavy flywheels; reinforced electric-welded bases, fully stress-relieved.



ROLL CRUSHERS

Designed to match high capacities of large screens and conveyors: Heavier than average bearings; exclusive feed design to utilize full width of rolls for crushing; higher speed operation (peripheral speed of roll, 500 fpm); patented shim adjustment quickly increases or decreases opening between rolls. Choose the roll crusher size you need to balance the output of the primary jaw crusher.



SCREENS

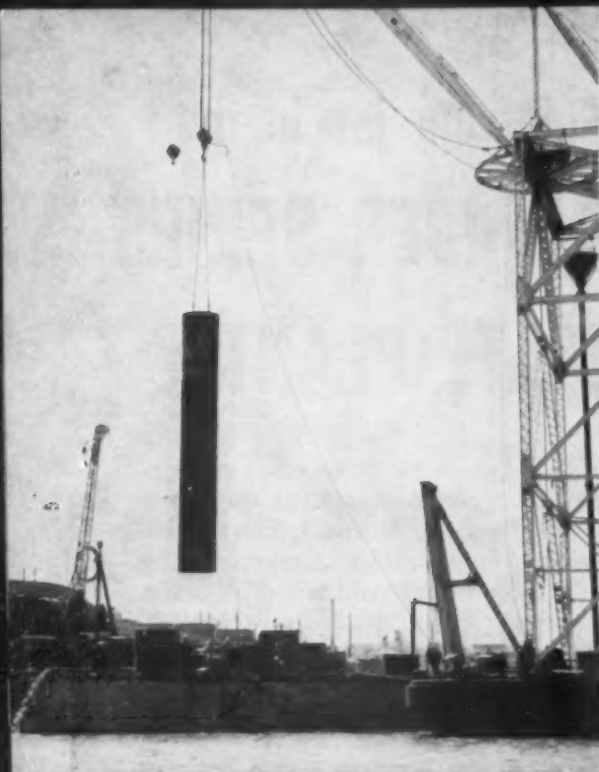
Cedarapids horizontal vibrating screens are engineered for extremely high capacity per square foot of screening area. You get up to 30% greater capacity than with an inclined screen of the same length. Check these bonus benefits: Snappy, lively action assures fast separation, prevents choking of crushers with screen carryover; fully stress-relieved screen boxes and frames; clamps hold screen wire tight, reduce screen cloth breakage.

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa

Cedarapids

PISTON

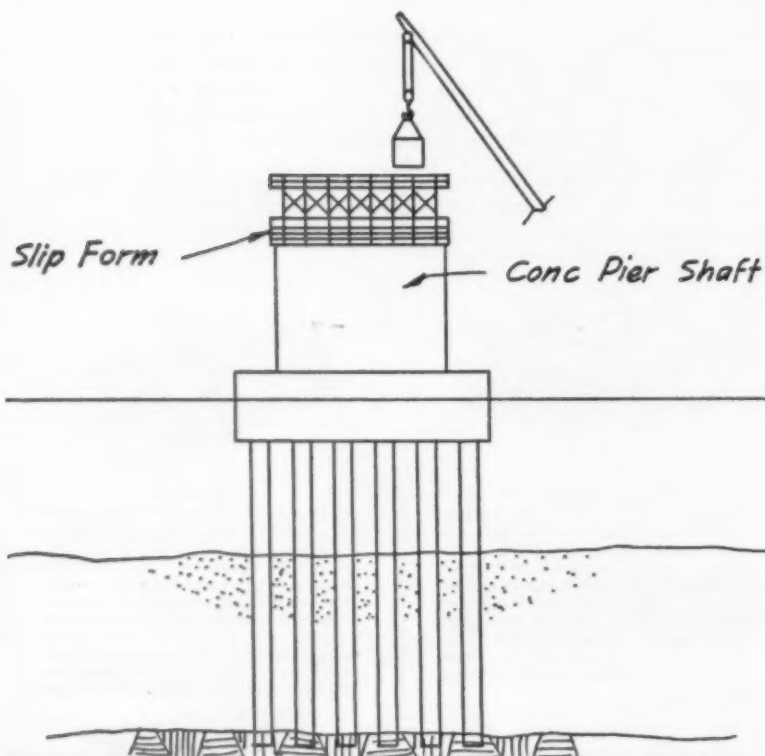
Built by
IOWA



One of the caissons being swung into position for lowering through an opening in the anchored floating concrete footing block.



Mile-long Benicia-Martinez Bridge across Northern California's Carquinez Straits, to be completed in 1962. Three water piers will rest on box footings supported by concrete filled steel caissons.



When the caissons and the box footing concrete work are completed, a 12-in. concrete slab and the base of the concrete shaft are poured over the top. The concrete shaft, poured by the slip-form method, will extend above the footings to a maximum of about 150 ft. to form the support for the steel truss shoes. (FIG. 3)

HOLLOW PIER FOOTINGS

Continued from page 65

and pump out the material down to bedrock and 2 ft. into it. At this point the 78-in. drill is removed and replaced with a 62-in. drill for another 5 ft. of drilling into bedrock. If the rock is found to be sound, the drill is removed and the 72-in. steel caisson is lowered into place at the bottom of the 78-in. hole.

The drilled hole 5 ft. below the caisson is then cleaned and inspected by deep sea divers to insure a solid rock footing and a clean hole for the concrete. A reinforcing steel cage is placed in the bottom and the concrete is then poured up to the footing block.

A total of 40,000 cu. yd. of concrete will be used in the substructure, according to William Ziegler, Yuba's project superintendent. The four corner caissons are the first to be placed and concreted into the box footing, with transfer of the load of the box footing to the corner caissons accomplished at high tide.

Continued on page 72

PLYWOOD and *plyroads* have the same desirable characteristics. They both resist warping or buckling—when their layers are properly bonded. That's where the road-bonding PULVI-MIXER comes in. Its whirling tines not only blend each lift, they reach down and take a tie-in shave with the layer below. Actually *fuse* the two together. There are no voids or moisture pockets between lifts . . . no damage from sub-surface pressures. The first PULVI-MIXER-built roads are more than 20 years old. How long *do* they last? Patience. We will have to wait and see. They have already outlasted roads built by any other method. There is a booklet describing many other features of PULVI-MIXER operation. It's yours for the asking. Just call your American-Marietta distributor, or write American-Marietta Company, Construction Machinery Division, Milwaukee 1, Wisconsin.



AMERICAN-MARIETTA

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Prestressing with **USS** American High Tensile Grade Wire adds strength and durability to 11,000 ft. of 36" concrete pressure pipe installed along Cincinnati main artery

Cincinnati's Montgomery Road is one of the busiest streets in town. It feeds main line traffic into Cincinnati from the Northeast. Recently the city faced the problem of extending a 36" water line 11,000 ft. down Montgomery Road. The job had to be done fast. The road had to be kept open. The answer was Concrete Pressure Pipe prestressed with USS AMERICAN Bright-Drawn High Tensile Grade Wire. A special steel-and-rubber joint which is made quickly and easily sealed adjacent ends of the pipe.

According to contractor A. F. Jelen & Son Company, Cincinnati, the special joint allowed them to lay the pipe without a hitch, and the job was finished right on schedule. Furthermore, the joint remains bottle-tight under the heaviest traffic loads.

The prestressed steel-and-concrete pressure pipe for the Cincinnati job was manufactured by Price Brothers Company, Dayton, Ohio. It's made by forming a steel plate into a cylinder. The seam is welded and the pipe undergoes a high-pressure hydrostatic test to make certain the weld is tight. The inside of the cylinder is then covered with a layer of centrifugally cast concrete and the cylinder, with its concrete core, is wrapped with a helix of USS AMERICAN Bright-Drawn High Tensile Grade Wire made to ASTM specification A-227. After wrapping, the entire pipe is covered with mortar to protect the wire

from corrosion. Tension in the wire places the concrete and steel cylindrical shell in compression. In service, the internal pressure caused by the liquid acts to overcome this pressure. Thousands of miles of this and other types of prestressed concrete pipe have been installed across the country.

USS American Steel and Wire Division pioneered the making of high tensile strength steels for prestressed concrete construction. And we are constantly working with manufacturers to make sure they get the wire they need to keep the quality of their product high. Get the complete story in our free 56-page brochure: *USS American Wire and Strand for Prestressed Concrete*. Write today: American Steel and Wire, 614 Superior Ave., N.W., Cleveland 13, Ohio. USS and American are registered trademarks



Steel cylinder, with concrete core, wrapped with USS AMERICAN High Strength Wire. Wire is then covered with mortar coating.

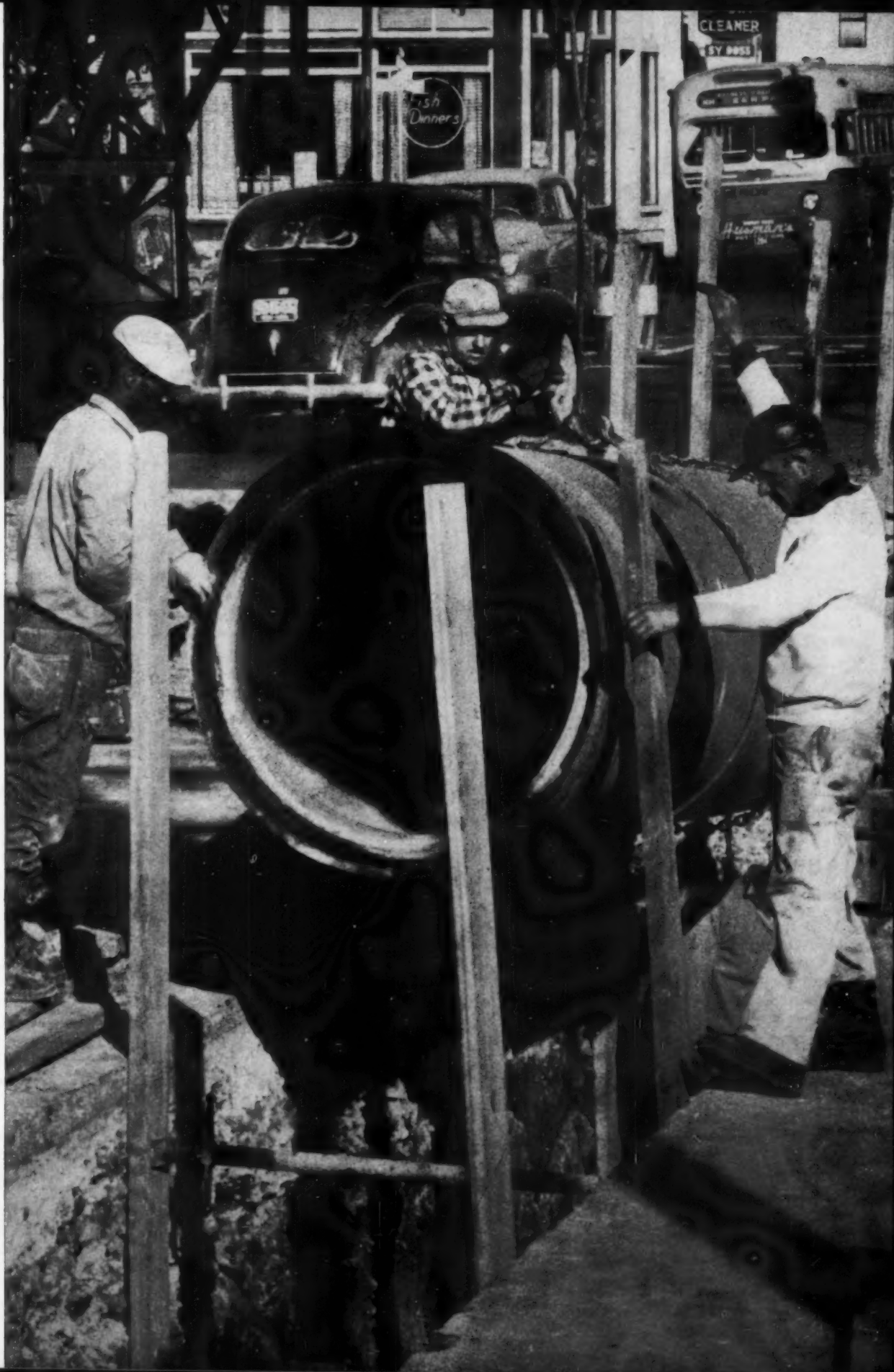


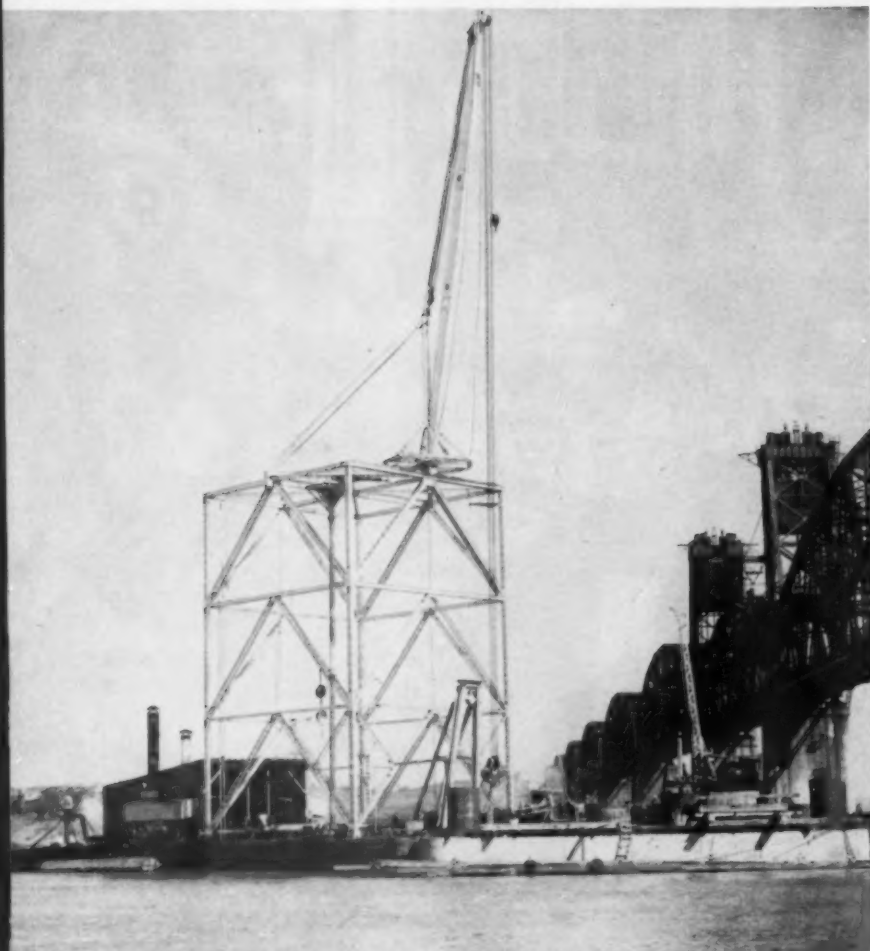
**American Steel and Wire
Division of
United States Steel**

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, New York, Distributors Abroad

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ROADS AND STREETS, July, 1961





Floating equipment including tower supported derrick, seen setting 72-in.-diameter steel caisson through a 1,700-ton floating concrete pier footing (right).

HOLLOW PIER FOOTINGS

Continued from page 68

As the tide goes out, the footing comes to rest on (and is anchored to) the four corner caissons. When completed, each footing is thus completely anchored and becomes integral with the 8 or 10 caisson legs, and each pier is resting on and is anchored into bedrock.

Each pier, when completed, will be protected against damage from navigation by heavy concrete pile protective fenders.

The concrete box footings have been poured on launching ways at the Richmond, California, yard of Yuba Erectors, while the steel caissons are fabricated less than a mile from the job.

The Inspector's Lament

I've got myself into a jam,
My judgments gone to pot,
My decisions are no longer fair
My sense of value's shot.

How could I have sunk so low?
It's really quite a pity,
And I've just been subpoenaed,
By the Blatnik Committee.

I find myself entangled
In this Contractor's debt,
For I forgot myself and took,
His offered cigarette.

(Written by an anonymous Virginia state highway employee and published in the Bulletin of the Virginia Road Builders' Association.)

Labor

Davis-Bacon - Who Has Wage Rate Say?

(From Virginia Road Builders Association Bulletin to contractor members)

A recent ruling by the Comptroller General implies that the Bureau of Public Roads has more authority over the enforcement of wage rates on Interstate construction, and the Labor Department has less control than has been exercised by them. We think that this is a significant ruling, because the Bureau of Public Roads recently appealed the Labor Department's unreasonable ruling on owner operators to the Attorney General, who sided with the Labor Department.

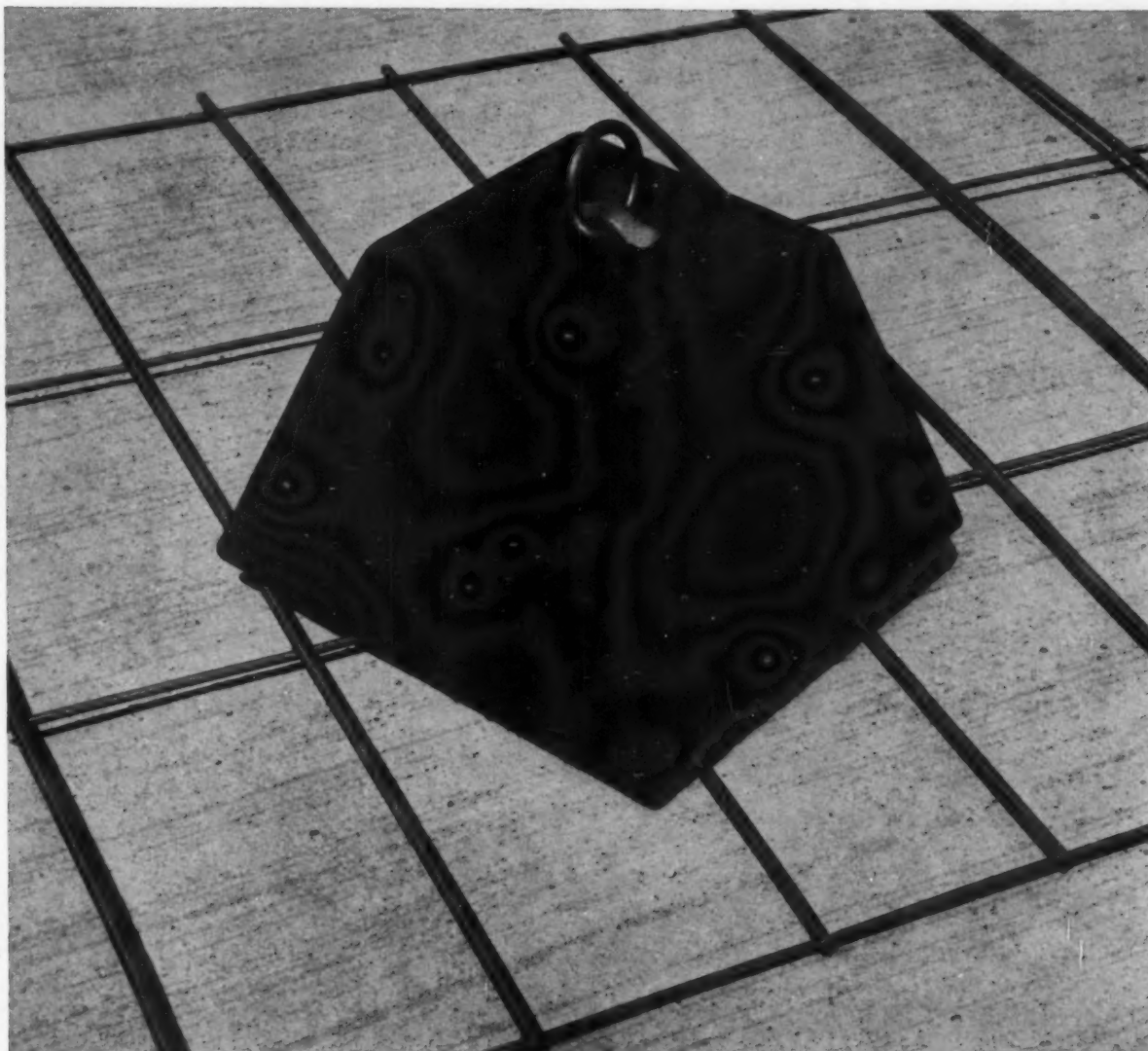
It appears that rather than the Labor Department having the final say on predetermined wage rates, the Secretary of Commerce has the right to require that the rates which he will enforce reasonably resemble the average wage rates in the area, rather than rates, right or wrong, which the Secretary of Labor might determine.

Unions Can Bargain On Job Cuts

The U.S. Supreme Court not only says that a union has the right to negotiate with an employer over job cuts, but it has the right to strike. The case arose when a railroad union sought to eliminate telegraphers who worked as little as 12 minutes a day. The Court's decision applies to all labor relations.

The Court said that if Congress wants to prevent strikes over job eliminations that it should rewrite the labor law. Senator Dirksen (R-Ill.) promptly introduced a bill in Congress. It would prevent unions from bargaining both over the elimination of jobs and the creation of jobs.

The Court said nothing about unions' rights to bargain over creating new jobs. But the Senator apparently believes that it is as logical for the Supreme Court to permit unions to bargain over creating jobs as over eliminating them.



Heavy loads shorten concrete road life... CF&I Welded Wire Fabric lengthens it

In modern concrete highways, reinforcement with welded wire fabric is important. Without it, major arteries don't stand up well against pounding tires and heavy loads.

When embedded in concrete, CF&I Welded Wire Fabric serves as a steel backbone that literally holds highways together. It cushions the impact of heavy, fast-moving vehicles by distributing load stresses and minimizing crack-

ing. And these are the things that make the difference between long, trouble-free road life and expensive maintenance operations.

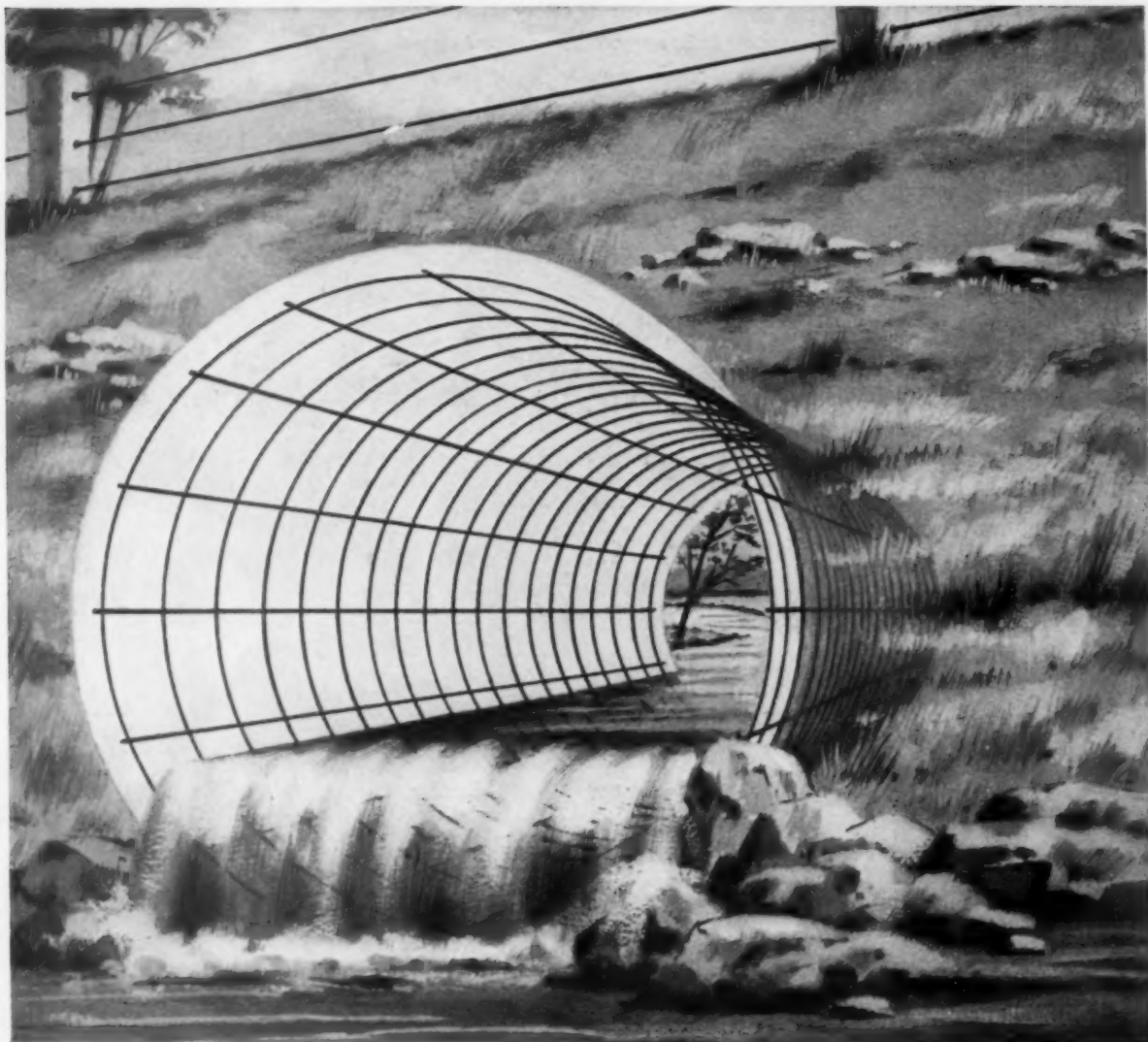
Put CF&I Welded Wire Fabric to work in your roads. It meets all ASTM specifications and is available in a wide range of gages and spacings to meet virtually every type of reinforcing requirement. Call your nearby CF&I sales office for complete details.

THE COLORADO FUEL AND IRON CORPORATION

Denver • Oakland • New York
Sales Offices in Key Cities



... for more details circle 353 on enclosed return postal card



Interested in pipe life?

CF&I Welded Wire Fabric lengthens it

In culverts and drainage systems, concrete pipe has to fight a constant battle against external pressures. But it has a powerful ally in CF&I Welded Wire Fabric.

Reinforcement with this tough steel mesh combines the strength of steel with the permanence of concrete. The result is pipe that has greater structural

strength, maximum corrosion-resistance, and the overall toughness that means long, maintenance-free life.

CF&I Welded Wire Fabric meets all ASTM specifications and is available in a wide range of gages and spacings to meet virtually every requirement. Ask your CF&I salesman for complete details.

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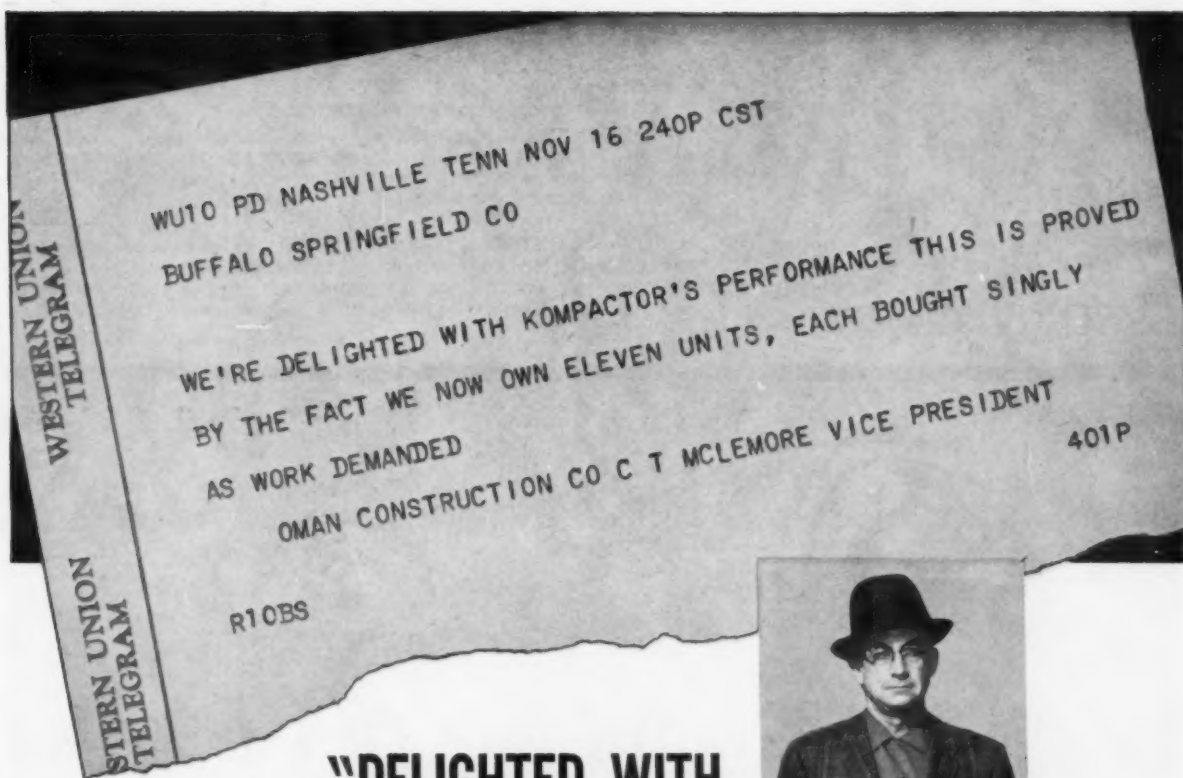
THE COLORADO FUEL AND IRON CORPORATION

Denver • Oakland • New York

Sales Offices in Key Cities

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"DELIGHTED WITH KOMPACTOR® PERFORMANCE... OWN ELEVEN"

says C. T. MCLEMORE, Vice President, Oman Construction Co.



Road-to-Basement — Oman Kompactors on highway job, and compacting fill in building basement show extreme versatility of machine. Each pad segment exerts pressure of 580 lbs. per lineal inch for total length of pad.

**BUFFALO-
SPRINGFIELD
COMPANY**

Springfield, Ohio

8103

A Division of
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Many cost-conscious contractors, like Oman Construction Co. have found Kompactor the practical answer to meeting density requirements. It's self-propelled, operates on an interrupted pressure principle that delivers the compaction you need in less time and with fewer passes. You get more uniform density. There's no displacement of materials due to "bulldozing" ahead of the wheels. And with Kompactor, you can wheel in tight to culverts, walls, and abutments — eliminate a lot of costly hand tamping work. Cost of compaction with Kompactor: About two cents per yard. See your distributor.



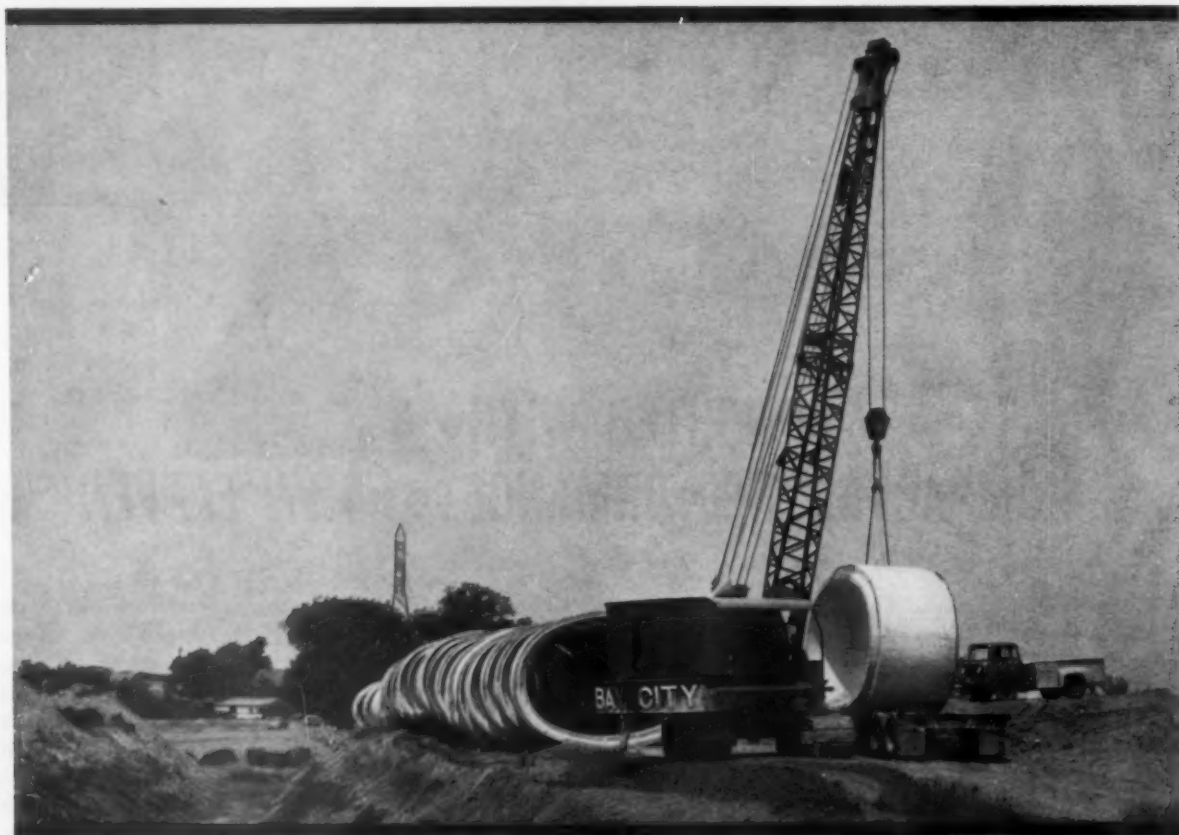
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BAY CITY 72
Will Help You
Close the
"PROFIT GAP"

What's the true measure of a profit-producing crane-excavator? On-the-job ability and on-the-job dependability. You get both, in the highest degree, in a BAY CITY Model 72. This 1½-yd. excavator with 30-ton Crane capacity offers you a combination of proved advantages that can well make the difference between break-even and profit.

• **SMOOTH, BALANCED POWER** is provided through a fluid coupling and an enclosed speed reducing unit consisting of helical gears splined to shafts mounted on ball bearings. Running constantly in a bath of lubricant, this assembly gives longer life . . . eliminates adjustments required with a chain drive.

• **POWER CONTROLLED BOOSTERS** set main clutches with minimum hand lever pull. While easy to adjust, these clutches actually require less maintenance attention — there are no delicate mechanisms such as compressors, pumps, valves or tubing lines to cause trouble and slow down operations.



Here's a Model 72 in action during relocation of U. S. Hwy. 12 near Benton Harbor, Mich. The machine is working on a large drain section over which an overpass is to be built. Each 13-ft. dia. drain pipe weighs 22 tons.

• **CAST STEEL BASES** for lower works and revolving frame resist deflection . . . withstand shock loading . . . assure longer service with minimum maintenance. Roller and ball bearing mounting of all drums and shafts assures maximum transmission of power.

• **ALSO AVAILABLE AS ERECTION CRANE** with a fully independent boom hoist, power operated for both raising and lowering, an automatically set boom brake, a power load lowering device, a collapsible hi-gantry, pendant cable suspension, telescopic boom stops and pin-connected boom sections. This combination of features results in faster, safer load lifting and spotting . . . quicker, easier setups.

If you are planning on new equipment, there are many other Model 72 advantages you should know about. Have your BAY CITY dealer tell you what they are. Remember — there is a difference between promising bigger profit margins and actually delivering them!

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Around the table at the special 1961 short course given for Ohio contractor owners and general managers.

Continued Education For Ohio's Contractors

Top management men as well as project personnel "come back for more" in Ohio's popular short course

By Emmett H. Karrer

Professor of Highway Engineering
Ohio State University, Columbus

The proof of the pudding is in the eating. This old adage seems to fit the attitude of highway contractors in Ohio in their interest in continued education. This continued education has been provided through a series of shortcourses and seminars conducted by the Department of Civil Engineering of the Ohio State University, in cooperation with the Ohio Contractors Association. Judging by the way the contractors have been eating our pudding and asking for more, we can only conclude that the recipe used for making the pudding must be good.

In articles in the August and September, 1960, issues of Roads and Streets magazine a summary was made of shortcourses which had then been conducted. The continued interest and attendance of contractors at these shortcourses is noteworthy. The basic shortcourse for contractor supervisors is one in which the practicing construction supervisory personnel are given a full week of review. This covers the fundamentals of soils, aggregates, cements, equipment capabilities and limitations, familiarity with specifications, safety, labor relations, and human relations. This course has now been repeated six times, since the first session was held in February of 1958. A total of 202 supervisors have completed this course.

For Earthwork Job Supervisors

Forty-seven men have attended the special three-day shortcourse for supervisors of earthwork construc-

Courses for Contractor

Part 1. Modern Management

I. The Field of Management

- A. Distinctive characteristics of management
- B. Functions of management

II. Importance of a Philosophy of Management

- A. Nature of a philosophy of management
- B. Factors in a philosophy of management

III. Management Planning

- A. Method of planning
- B. Factors that affect planning
- C. Steps in planning
- D. Aids to planning
- E. Limitations to effective planning

IV. Organizing and Organization Structure

- A. Factors which are organized
- B. Basis for dividing work
- C. Line vs. staff activities
- D. Use of organization charts and manuals
 - 1. Definition of authority and responsibility
 - 2. Aid in delegation and making assignments
 - 3. Control through proper accountability
- E. Steps in organizational planning
- F. Principles of organizing
- G. Organizing the personnel force
 - 1. Recruitment and selection
 - 2. Assignment of responsibilities
 - 3. Development of individual abilities
 - 4. Maintenance of effective personnel relations and performance

V. Direction and Communications

- A. Translation of plans and orders into action
 - 1. Sizing up the immediate job
 - 2. Issuing commands and explanations
 - 3. On-the-job supervision
- B. Organization framework of communications
 - 1. Vertical lines
 - 2. Horizontal lines
 - 3. Formal and informal channels
- C. Purposes and content of communications
 - 1. Purposes
 - a. Information

- b. Education
- c. Understanding
- d. Indoctrination
- e. Integration

2. Content

- a. Orders and instructions
- b. Reports
- c. Other information

- D. Semantics and reasons for misunderstanding
- E. Techniques of effective communications

- 1. Written communications
- 2. Oral communications
- 3. How to listen
- 4. Practice of giving reasons
- 5. Plan for communicating
- 6. Actions as communicators

F. Developing effective morale and motivation

- 1. Analyzing morale
- 2. Incentives, individual needs and performance
- 3. General steps in positive motivation

VI. Managerial Control

A. Functions of control

- 1. Setting standards for performance
- 2. Reporting of results
- 3. Evaluating results
- 4. Taking corrective action

B. Devices of control

- 1. Personal means
- 2. Mechanical devices
- 3. Procedure and organization structure

C. Control by exception

D. Influence of supervisory leadership

- 1. Formal means of control
- 2. Informal means of control

Part 2. Records

I. Accounting Procedures

- A. The accounting system
- B. Cost records
- C. Mechanized accounting
- D. Field records vs. central office records
- E. Avoiding unnecessary records and duplication

tion. In this course, consideration was given to fundamentals of soils, their classification, the moisture-density relationship, excavation, transportation, and compaction procedures. Also use of soil profiles and mass diagrams, drainage, use of explosives in rock work; and the capabilities and limitations of earth moving equipment from bulldozers to draglines. An important part of the course was the instruction to contractor supervisors on how to conduct their own

production cost studies.

Thirty-seven men attended a special three day short-course for bridge supervisors. In this course consideration was given to foundations, cofferdams, pumping, piles, excavation for footings, forms for substructures, both steel and concrete superstructures, and bridge floors.

A Bituminous Concrete Quality Improvement Seminary has been repeated twice with a total attendance

Top Management

II. Responsibilities of Accountant

- A. Operation of the system
- B. Providing data to management
- C. Correlate accounting, engineering, and field data
- D. Determine cost or economy of premium pay

III. Meaningful Records on Equipment Usage

- A. Usage records
- B. Lease vs. purchase of equipment
- C. Maintenance and repair records

IV. Usable Records for Estimating Future Costs

- A. By operation or function
- B. Past experience
- C. Record of favorable and unfavorable factors

Part 3. Financial Management for Highway Contractors

I. Capital

- A. What is it?
- B. Its importance

II. Sources of Capital—Risk, Cost, Control

- A. Equity capital
 - 1. Owner Contributions
 - 2. Reinvested earnings
- B. Creditor capital
 - 1. Long term
 - 2. Short term
 - a. Bank
 - b. Trade credit
 - 3. Intermediate term
 - 4. Importance of credit rating
- C. Depreciation as a source of funds
- D. Rent

III. Capital Planning

- A. Cash budgeting
- B. Capital budgets
 - 1. Long term vs. short term needs

IV. Return on Capital Concept

- A. Profit and its purpose
- B. Return on sales vs. return on capital
- C. Return relative to risk involved
- D. Relative use of return on capital

V. Financial Control

- A. Budgets
 - 1. Standards of performance
 - 2. Variance analysis
 - 3. Possible actions
- B. Ratio Analysis
- C. Policy control

VI. Special Problems

- A. Rent vs. own
- B. Wage, bonus, profit interest
- C. Solvency vs. profitability

Part 4. Taxes

I. Form of Organization for Tax Minimization

- A. Proprietorship, partnership, or corporation
- B. Election for corporation to be taxed as partnership

II. Method of Accounting

- A. Cost vs. accrual accounting
- B. Completed contract
- C. Percentage of completion
- D. Hybrid methods

III. Tax Savings Opportunities

- A. The graduate tax bracket
- B. Loss carry-overs and carry-backs
- C. Hurrying or delaying expense and income
- D. Capital vs. revenue expenditures
- E. Bonus arrangements
- F. Sale or trade of equipment
- G. Lease-purchase arrangements

IV. Depreciation

- A. Depreciation methods
- B. Salvage
- C. Excessive use
- D. Correlating depreciation with income
- E. Used equipment

V. Non-Deductible Expenditures

- A. Capital Expenditures
- B. Payments against public policy

VI. State and Local Tax Considerations

- A. Personal property tax problems
- B. Payroll taxes
- C. State and local income taxes
- D. Licenses, qualifying fees, etc.

of 81. This seminary was sponsored with the cooperation of the Bituminous Concrete Producers Association of Ohio discussions. It covered producing and stockpiling of aggregates, drying, screening, storing and proportioning of aggregates; types and usage of bituminous materials; design and production of bituminous mixes; testing and inspection procedures; prime coats, seal coats and surface treatments. Construction practices followed in transporting, spread-

ing, and compacting bituminous mixtures.

Bosses Get Interested

After sending many of their supervisory personnel to these shortcourses, many of Ohio's contractor owners and general managers became interested in this effort in continued education. To serve this interest a special shortcourse was set-up in the Winter of 1960 for top management. Here Ohio State's College of

Commerce and Administration joined forces with the Department of Civil Engineering. This course with some modifications was repeated in 1961 with a total of 62 management men attending the two sessions.

In the 1961 course the program included a comprehensive list of topics, these are tabulated for the benefit of those who might be considering a similar effort in other states.

There are so many problems which might be proper subjects for a shortcourse in management that it is, of course, impossible to cover all of them in a reasonable length of time. A reasonable length of time is perhaps the amount of time that a contractor owner or manager feels that he can devote to this type of effort. The program this year was changed considerable from the program of 1960. It is probable that we will each year change the subject matter a bit, so as to make the program interesting to top management men who may wish to repeat the seminar.

For the basic course for supervisors and the special courses, there are always new developments, new machines, new techniques and changes in specifications which need to be considered. Consequently some contractors supervisors have indicated an interest in repeating the courses every three or four years.

In addition to the regular University faculty members who have served as staff for the shortcourses, several practicing contractors have been called in to handle special subjects. Engineers from the Ohio Department of Highways have also served. With this

variety in the teaching staff the presentation has been kept at a practical but still a challenging level. The experience of the University faculty members in working closely with practicing construction supervisors has been of real value in helping the staff to better understand construction problems and thus to become better teachers of engineering principles.

Provokes Thinking on Specifications

One important by-product of the seminar is the crystalizing of the thinking on the part of contractor's supervisors on specifications which are at present unreasonably restrictive. Several instances have occurred where new techniques and new machines known to contractors to be good, but which are prohibited under present state specifications have been brought to light. Clearing up of ideas on these specifications can sometimes result in advice to the Highway Department on changes which should be made in the specifications.

While a contractor's job may be the building of a highway, bridge, dam, or other structures his responsibility is, at the same time, to make a profit. Unless he makes a profit he will soon cease to be a contractor. It may therefore reasonably be assumed that in our shortcourses contractors feel that they are getting their moneys worth in ideas which will enable them to improve their margin of profit.

BRITISH ROAD PROGRAM *Continued from page 49*

This may have been in accordance with the specifications. At any rate, the English contractors will need to come under the same contractor-engineer relationship that has made the highway program tick here at home. The contractor must, to make profits, pull for speed and volume of work in place, using every permissible short-cut and efficiency method. The engineers must see that the short-cuts do not include short cuts of quality methods.

In England it has been said by some observers that the contractors now emerging as the country's leading highway builders have heretofore been experienced chiefly in handling private work, much of it building structural, where a different set of quality controls has figured in their operations.

Fifth, on the M.26 project we saw an approach in planning field methods which we think should be considered more often in the United States. An area that had been brought full width to template grade was being utilized for various experimental schemes to find the best way to place the cement-treated sub-base, base layers and other elements. Different types and sizes of rollers were given a try-out. These included small steel vibrating rollers for sand, and different types of pulverizing mixers.

When this effort is concluded both the engineers and the contractor's field people will proceed with greater certainty to execute the job. Perhaps this idea of building a test section before going ahead stems from newness of the Motorway program. The U. S.

Navy has found this procedure good for building airfields, by the way.

A sixth jotting: consulting engineers are playing a key role in the Motorway program. This is explained as being desirable because it isn't considered feasible to suddenly expand a County Council's highway engineering organization for building a huge federal-aid road project, only to disband the staff in a couple of years. Consultants are better able to manage such sudden expansion and contraction of staff.

And finally, seventh in our notebook entries, back in London we were impressed by the public relations consciousness of the larger contractors. The firms heading the highway builders, such as Laing and Cubitts, are much like the largest multiple-operation highway-heavy-building firms in the United States. Cubitts, whose work takes in hundreds of projects per year, has a full-time public relations chief with a six-man staff, a fancy house organ, published brochures, and systematic contacts with the press.

This would seem to be part of a noteworthy tradition of leadership, of being strong and out ahead, that has made the big firms big and kept them that way. It will be interesting to see how they continue to lend a hand in the highway work that will transform Great Britain. This country's program has advanced fast, after a tardy start, and is now at a pace equivalent to \$800 million per year in U. S. money terms, pushing Canada and Germany for second place behind the United States in the global race to build roads.

Traffic Safety—

Auto Safety Foundation Announces Grant

The Automotive Safety Foundation, an industry-supported organization, has granted \$650,000 to 23 groups to promote safe and efficient highway transportation. The recipients include:

- The National Safety Council, for its Annual Inventory of Traffic Safety Activities in which state and municipal programs are compared with nationally-accepted standards.
- Yale University for fellowships and for training traffic engineers.
- The Northwestern University Traffic Institute, and the International Association of Chiefs of Police.
- Also the American Bar Association (for its traffic court improvement program); the General Federation of Women's Clubs (for safety campaigns); National Congress of Parents and Teachers (for traffic safety material); the Auto Industries Highway Safety Committee; the President's Committee for Traffic Safety; and sums to 14 other organizations.

DO MODERN HIGHWAYS really make driving safer? The answer is yes, and the Missouri state highway department has a new specific example to prove it. In October a new 21.3-mile section of Interstate Route 70 was opened in central Missouri between Boonville and Columbia. It replaced US 40 as the main highway between those points. During the first full month of operation there were two accidents (one injury and no fatalities) on the new freeway segment. During that month there were 13 accidents (14 injuries and no fatalities) on parallel US 40 between these same two points. This was despite the lessened traffic since the freeway took over.

IN COLORADO a man was recently found guilty in a district court of destroying highway signs, and sentenced to a term of 1½ to 2 years in the state penitentiary.



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Getting Down to Details On Project Quality Control

From an outline of the basics of field control and project procedures, given by Mr. Edwards at the Western Association of State Highway Officials' annual meeting April 24-28 at Las Vegas, Nevada. The accompanying photos were supplied by Mr. Edwards at the Editor's request, to help visualize some of the familiar tests that are now in the spotlight.

By Tom Edwards

Construction Engineer, Oregon State Highway Department, Salem

We are all familiar with the development of the planning phase of modern highway system building, and with refinement that has gone into the design phases of bringing projects to the contracting stage. Specifications have been revised, new techniques introduced, and progress made on the utilizing of new materials.

All of this goes for naught if the transformation of all this effort into modern, high quality roadbeds does not receive the same care and attention. This end result of high quality can only be obtained by proper specifications and use of high caliber, well-trained personnel. We, as highway administrators, must take all necessary steps toward full value for the highway dollars spent.

Three Fundamental Safeguards

To implement this control at the field level, review should be made of operational procedures to obtain quality of work and to insure accurate measurement, computation, and certification of pay quantities. This will require review, and revitalization where necessary, of three procedures which should be standard:

1. A regular program of day-by-day routine checks.
2. A practical system of periodic but unscheduled double checks.
3. A requirement for documentation to the end that the final record substantiates permanently the decisions made.

Quality control can only be attained where a department is staffed with sufficient competent personnel to administer its operations and provide enough inspection. Over-assignment of work loads to project personnel must be avoided if good inspection and control are to result.

In this connection, proper delegation of authority must be made to the field level, with the limits well defined. This delegation must be made and administered in such a fashion as to instill confidence in the field people. The opinions and views of project personnel should be given consideration in settling matters of controversy between the contractor and the contracting agency. All of this will serve to maintain confidence of the project personnel in their superiors and impress upon them that we are all working to the same end. All of

this, of course, contributes toward *Good Morale*, which is necessary in obtaining proper project control.

Project Engineer's Qualifications

A project engineer should be selected with care, as it is his responsibility to obtain the results specified in contract document. He is the keystone of the project organization. All important instructions given the contractor by the project engineer should be given in writing or confirmed in writing and become a part of the job file.

The project engineer should also maintain a job diary listing all major actions, events, decisions, equipment operating, accomplishment, weather, and personnel assignments in a concise, accurate, and factual form.

It is a prime responsibility of the project engineer to insure that no material goes into the project that has not been determined by test or certification as satisfactory for use under the specifications.

Specifications

The specification's should be realistic; results specified beyond actual requirements or possibility



Diamond bit coring machine used for checking thickness of PCC pavement.

of attainment within the characteristics of the material being worked with invite deviations and add unnecessarily to the cost. Under a situation such as this, the inspector cannot discharge his duties effectively.

Specifications which are vague or obscure as to intent are the cause of serious controversies. When these are encountered in the course of a job, steps for revision should be taken to clarify the specification before it is repeated in another contract. Fuzzy specifications not only generate ill will on a job and lead to claims, but create a vulnerability for the department with respect to third-party criticism.

Material Quantities

The checking of material quantities delivered and incorporated into a project has always been a problem, and will continue to be.

However, some fundamental built-in safeguards should be observed. Materials which are paid for on a weight basis should be weighed only on tested or certified scales.

The weighing of the individual

loads shall be done only in the presence of a State inspector with the weigh ticket being signed by him.

Validation of the materials receipt should require the action of two State inspectors, one at the point of loading and one at the point of delivery. Information furnished on the haul ticket should state the type of material, the amount, identification of the delivery vehicle, the date, the project, and the point of deposit.

Material receipts should be serially-numbered, with strict accounting made for each receipt whether used or unused. All material receipts validated by project personnel representing materials accepted and incorporated should be turned in at the end of each workday period to the project engineer, and a reconciliation made at that time between quantities checked at the point of loading or weighing and quantities received on the road.

When material is paid for on the volume basis in the transporting vehicle, the project checker shall record the size of the hauling vehicle by dimensions and take care

that the proper volume is actually being delivered. Partially-filled loads should be rejected or returned to the loading point to be completed.

It is extremely important that only personnel of the highest integrity be employed as materials checkers. The project engineer, during the course of the project, should, by personal observation, determine that the system used for the receiving of materials and receipting for them is not breaking down. He should constantly spot check the performance of his materials inspectors.

Specification Digressions

Dimensional variations from specifications are not too difficult to control. Where thickness is a matter requiring control and measurement, it is well to pay for the item by weight or volume where possible. Thicknesses shown on the plans should be indicated as nominal, approximate, or with an allowable tolerance indicated. The tolerance indicated should be consistent with the economics involved which takes account of the requirements



Material being loaded, weighed, and weight ticket issued at crusher site.

of the design, capabilities of the construction equipment, and consistent with obtaining a satisfactory finished product.

However, even in those cases where the material is paid for by volume or weight, the inspecting force must be alert and endeavor to obtain the thickness named.

When portland cement concrete pavement is the pay item, and is paid for by the square yard, tolerance limits are particularly important and quite narrow. And the specifications should take cognizance of the course of action to be followed if the thickness of pave-

ment does not fall within the tolerance limits.

Modern paving techniques and equipment capacities on paving jobs have increased output. This increase is such that it puts a demand on the contracting agency to have sufficient personnel on the job

Continued on page 130

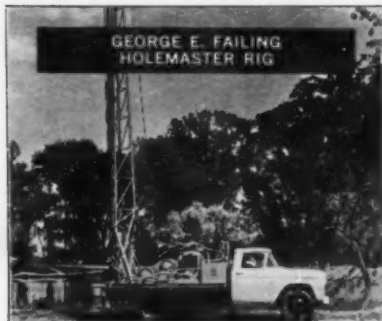


State inspector recording dimensional measurements of vehicle for volume payment.

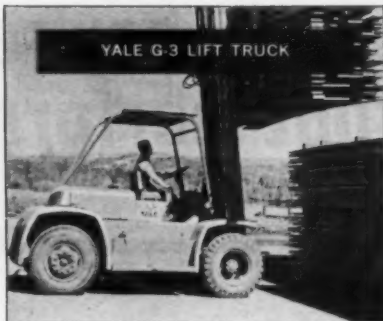


Validation of weight ticket at point of delivery.

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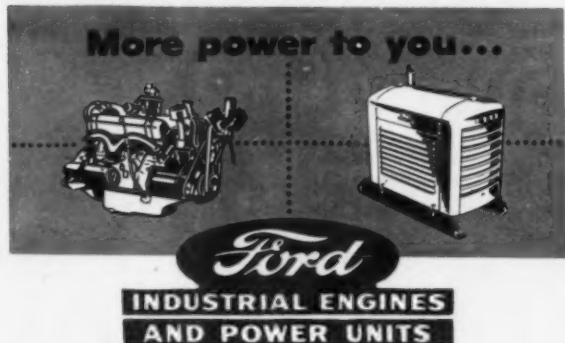
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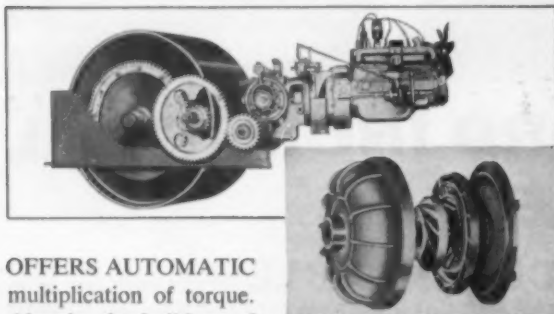
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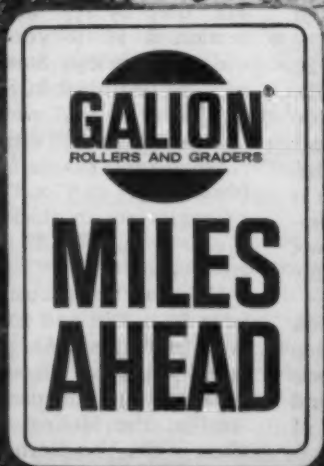


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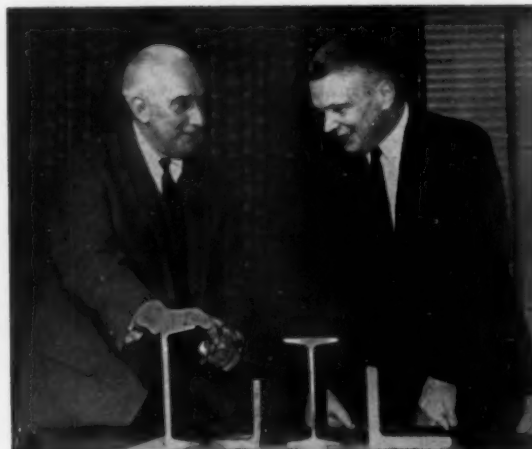
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86

ROADS AND STREETS, July, 1961



High-Strength Steels Now Come In Shapes



Shown discussing samples of the new standard shapes are U.S. Steel's Frank T. Bumbaugh, manager of alloy products sales (left) and Marcus M. Chapman, administrative vice president-commercial.

The commercial production of rolled structural shapes made from quenched and tempered alloy steels is announced by U.S. Steel Corporation.

Heat treated to design strengths as much as three times that of structural carbon steel, the new shapes reportedly promise "important weight and cost savings in a host of structural applications ranging from submarines to skyscrapers."

Furnished in standard I-beams, channels and angles, and in lengths up to 40 ft., the new shapes are produced from several of U.S. Steel's best known quenched and tempered alloy compositions. These include: USS "T-1" and "T-1" type A constructional alloy steels; 9% Nickel Steel for cryogenic applications at temperatures as low as -320° F; and HY-80 naval armor steel.

The new shapes are said to eliminate the need for many customers to cut quenched and tempered alloy steel plates and weld their own structural sections. By using shapes "off the shelf," customers can save about 30 percent compared to fabricating similar shapes. The 100,000 psi "T-1" shapes have the same toughness and excellent weldability as "T-1" steel plates, which have brought design changes for many types of equipment. Frank T. Bumbaugh, U.S. Steel's manager of alloy sales, said that the need to

carry bigger payloads makes the steels applicable to use in trucks, trailers, railroad and mine cars, barges, portable drilling rigs, bulldozers, power shovels, cranes, and many other items. Where structural members for trailer frames, crane booms and similar items are

Road Repair Savings Sought in New York

A highway maintenance mechanization program estimated to save \$11.5 million has been recommended by the New York State Activities.

The proposal calls for greater use and more strategic placement of trucks and other equipment by the state's department of public works. The commission also urged the department to: consolidate the 10 district maintenance and repair shops into five; rent or improvise, rather than buy, equipment that is not going to be used for a set minimum number of hours; and pool more equipment now used in only a single county.

Also replace equipment judiciously to avoid extensive upkeep costs; set standards of obsolescence; and establish a "systematic and faithfully observed" program of preventive maintenance.

now made by cutting and welding long lengths of quenched and tempered plate materials, the new structural shapes can be stocked for immediate use, he pointed out.

In buildings, bridges, transmission and TV towers and similar structures, Bumbaugh noted, the 100,000-psi minimum yield strength of "T-1" and "T-1" type A shapes will mean significant weight savings, in finished structures and also in terms of the tonnage shipped to the job site and handled during fabrication and erection.

The new quenched and tempered structural shapes are available in a wide range of standard sizes and foot weights. I-beams are American Standard, ranging from Section B 8 (12" deep by 3 1/4" wide) through Section B 14 (6" deep by 3 3/8" wide). American Standard channels are furnished in Sections C 1 (15" deep by 3 3/8" wide) through C 7 (6" deep by 2" wide).

Equal-angle shapes range in size from 3" x 3" to 8" x 8". The 3" x 3" angles are in thicknesses from 3/16 to 1/2 in.; 8" x 8" angles range from 1/2 to 1 1/4.

Unequal angles come in sizes from 3 1/2 x 3 in. to 8 x 6 in. in various thicknesses. At present, the rolled structural shapes are being quenched and tempered for U.S. Steel at the McKees Rocks, Pa., plant of the Van Dorn Iron Works Co.



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The T-340 has eye-opening capacity for handling stock-piling and clean-up work. In any material it gets heaping loads in a cycle-speeding 2nd and 3rd gear range of 2.2 to 3 mph.



Here's the only bottom-dump action available in any 3/4-yd loader—the amazing International Drott T-340 Four-in-One—a clamshell, scraper, dozer, and standard bucket, all in one!

Lick small job costs!

with T-340 stamina and 47 hp economy*

Here's go-anywhere traction at a budget price! . . . in a compact size that's easily transported between the host of small jobs that continually confront every contractor and public works official. A five-ton tilt-bed trailer pulled by a pick-up is all you need to take an International® T-340 or TD-340 from job to job quickly, at low cost.

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Users call them "terrific!"—and the International Dealer near you will gladly show you *why* with an on-the-job T-340 or TD-340 demonstration. For new, illustrated catalog, write International Harvester Company, Dept. RS-7, P.O. Box 7333, Chicago 80, Illinois. *Maximum engine hp at standard conditions



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Robert C. Myers, left, U. S. Steel's director of market development, and Robert S. Holmes, manager of highway construction marketing, discuss a new box truss design for a sign support.



Coming:

Windproof Signs, Better Highway Hardware

United States Steel Corporation has announced a new design and engineering program for "highway hardware." According to Robert C. Myers, director of market development, the program embodies design concepts and engineering-fabricating data for new ideas for steel signs, sign supports, guard rail, bridge rail, light standards and right-of-way fence.

To initiate the program, U.S. Steel has developed data for a variety of prototype structures for signs and sign supports, using the assistance of Wilbur Smith and Associates, consultants. This material is contained in a "Highway Hardware Technical Notebook," now available.

The second phase of the program involves specifications and design concepts for steel safety guard and

bridge rails, light standards and right-of-way fence. These will be incorporated in a second "Notebook" to be made available later in 1961.

All designs in Volume 1 of the Notebook conform to the specifications for signs and sign supports of the joint committee of the American Association of State Highway Officials and the American Road Builders' Association. The Notebook gives data in tabular or graphic form, for flexibility in dealing with variables such as (for sign supports): wind and ice loads, length of span, grade of steel, shape of members such as structural angles, T's and bars, pipe; and round, square and rectangular tubing.

Major emphasis in the first volume is placed on overhead sign

supports. Design concepts include a simple supported box truss of uniform section; a rigid frame for the intermediate span range; a unique tapered box truss hung between two trussed cantilever columns; a "butterfly" installation—a cantilever mounting in which signs extend over the highway from one or both sides of a single ground-based column. Design data are also included for smaller, single and double-posted ground mounted signs. Information on sheet steel sign faces and finishes include applications for phosphate-coated galvanized sheets, porcelain enameled and aluminum coated steel signs.

Company officials say that Volume II will discuss:

Bridge rail. Several designs of panel type railings, some for parapet mounting, others for full-height

ALLOWABLE SIGN AREA PER POST

WIND PRESSURE h, h ₁ or h ₂ [in feet]	40 p.s.f.							
	15	14	13	12	11	10	9	8
2 1/2 (5.79)						6	7	7
3 (7.58)		7	8	8	9	10	11	12
STANDARD PIPE POSTS A 36								
3 1/2 (9.11)	9	10	11	12	12	14	15	17
4 (10.79)	12	13	14	16	17	19	21	24
5 (14.62)	21	23	25	27	29	32	35	
6 (18.97)	33	36						

SELECTION CHART FOR ARMS

WIND PRESSURE 40 p.s.f. d in feet	L in feet				
	10	14	18	22	26
3.33	3(7.58)	4(10.79)	5(14.62)	6(18.97)	8(24.70)
5	3 1/2 (9.11)	5(14.62)	6(18.97)	8(24.70)	8(28.55)
6	4(10.79)	5(14.62)	6(18.97)	8(24.70)	10(31.20)
7	4(10.79)	6(18.97)	8(24.70)	8(24.70)	10(31.20)
8	5(14.62)	6(18.97)	8(24.70)	8(28.55)	10(31.20)
9	5(14.62)	6(18.97)	8(24.70)	10(31.20)	10(40.48)

All vertical web members for all values of L and d to be 1 1/2-inch extra strong pipe.
All diagonals for all values of L and d to be 1-inch by 1/2-inch bar.

BRIDGE 1 CHORD SELECTION CHART Design Wind Load 40 p.s.f. - Steel A 36

SPAN	
62	$\angle 3 \frac{1}{2} \times 3 \frac{1}{2} \times \frac{3}{8} (8.5)$ $- \angle 5 \times 3 (8.625)$ $\bigcirc 3 \frac{1}{4} \times \frac{3}{16} (6.148) - \bigcirc 2 \frac{5}{8} \times \frac{3}{16} (4.893) - \angle 3 \times 3 \times \frac{3}{16} (6.1)$
60	$\bigcirc 3 \frac{1}{4} \times \frac{3}{16} (5.897)$ $- \angle 3 \times 3 \times \frac{3}{8} (7.2)$ $\angle 2 \frac{1}{2} \times 2 \frac{1}{2} \times \frac{1}{2} (7.7)$ $- \square 2 \frac{1}{2} \times \frac{3}{16} (5.896) - \bigcirc 2 \frac{1}{2} \times \frac{3}{16} (4.642) - \bigcirc 2 \frac{1}{2} \times \frac{3}{16} (4.140)$
58	$\bigcirc 2 \frac{1}{2} \times \frac{3}{16} (5.79)$ $\bigcirc 3 \times \frac{3}{16} (5.646)$ $y = 2'$
	$y = 3'$
	$y = 4'$
	$h = 4'$

TOTAL LENGTH OF SIGN ALLOWED

SIGN DEPTH [FEET]	TOTAL LENGTH [FEET] [SUSPENDED SPAN]	TOTAL LENGTH [FEET] [EACH CANTILEVER ARM]
6	1.00 L ₁	1.00 L ₂
7	0.56 L ₁	0.56 L ₂
8	0.43 L ₁	0.43 L ₂
9	0.35 L ₁	0.35 L ₂
10	0.30 L ₁	0.30 L ₂
11	0.26 L ₁	0.26 L ₂
12	0.23 L ₁	0.23 L ₂

L = CLEAR SPAN IN FEET L₁ = SUSPENDED SPAN IN FEET
L₂ = CANTILEVER ARM IN FEET

Examples of handy charted data on sign and sign support design contained in U. S. Steel's new Handbook.

steel rails, are included. A design using beam type guard rail for the longitudinal members will be shown, as will one utilizing steel cable in conjunction with fascia rails formed from stainless or galvanized sheet steel.

Light standards. Considerations covered here will be those determining strength requirements: luminaire shape and weight, mounting height, and loads caused by wind, ice and overhead conductors.

Guard rail. Typical applications practiced by several states will be presented. This section will be expanded when results of extensive impact tests in New York State are known.

Right-of-way fence. Recommended specs for woven wire and chain link fencing are included, together with drawings showing construction details.

Lip Curb Removal Without Widening

Removal of lip curbs from older highways without pavement widening is being tried during 1961 on three Iowa state road modernization projects. This obsolete detail of existing concrete roads in Iowa has been removed extensively in recent years, but always in connection with immediate widening as well as placement of a bituminous overlay.

These will be the first projects in which curb is removed without widening. In addition, three different materials will be used in backfilling the removed areas. These first projects are being developed on a research basis so that contrac-

tors and engineers can determine the most economical and practical construction method of removing and backfilling the curb.

The curbs will be removed by sawing and breaking, as in the past. The area broken out will be backfilled using regular portland cement concrete or asphaltic concrete.

Experimental strips will also be included. In these cases, the portland cement concrete will receive additives intended to increase the strength of the bond between old and new concrete. Two additives to be tested are liquid latex, a synthetic rubber compound, and epoxy resin, a liquid polymer derived from petroleum. Each will be used on thousand-foot test lengths.

Biggest "EUC" Rear-Dumps now 45 and 62-tons



Model R-45
30 yds. struck... 45 tons
Model R-62
40 yds. struck... 62 tons

Designed and built for heavy off-highway service in construction, mine, quarry and industrial work, Rear-Dump "Eucs" have paced the industry for over 25 years. Now rated capacities of the two biggest models have been increased to meet field demand for still larger payloads than before.

Use of high strength alloy steel for all body wearing surfaces cuts net weight and increases payload capacity... there's no compromise on the rugged durability and performance that "Eucs" are known for throughout the world. And, although they're new in size, both the R-45 and R-62 have years of job-proved dependability since they are of the same design and incorporate the same major components as the well-known models they supersede.

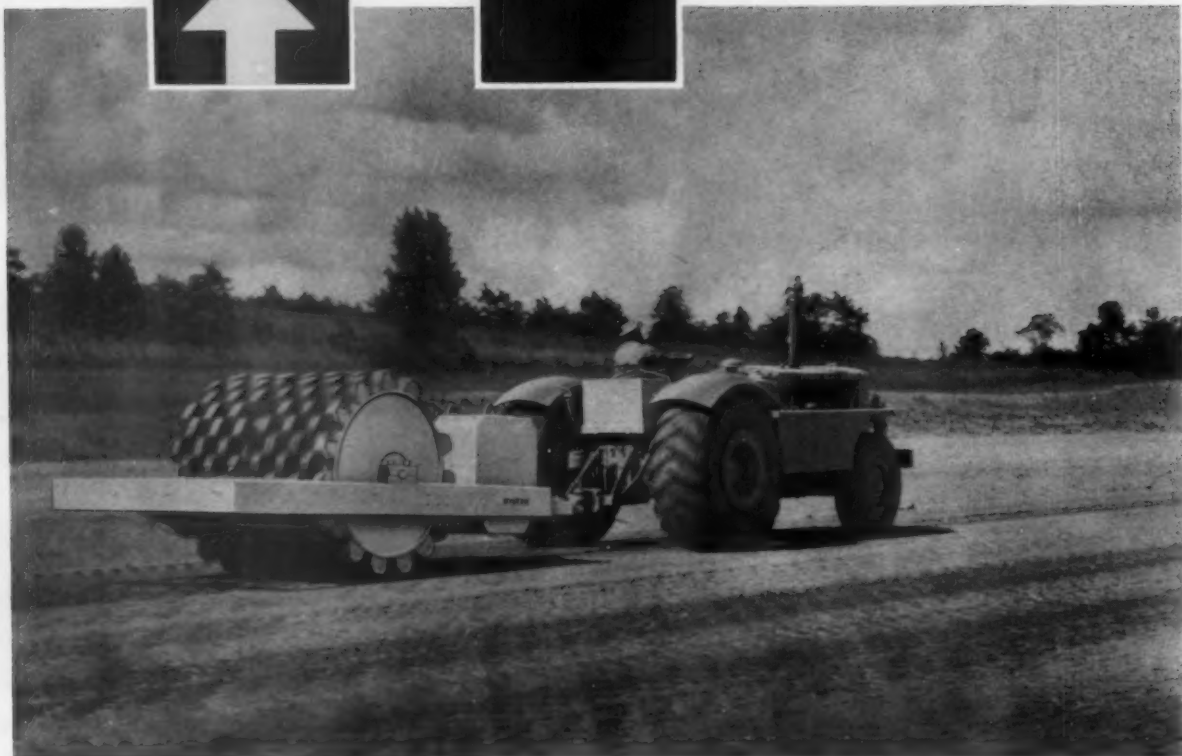
For work under large loading shovels on the big tonnage, big yardage jobs, check these Model R-45 and R-62 "Eucs". They have payload capacities of 90,000 and 124,000 pounds and replace the widely used 40 and 55-ton models in the Euclid line of rear-dumps.

Have your Euclid dealer give you detailed information and show you how these big "Eucs" can cut your hauling costs. Euclid Division of General Motors, Hudson, Ohio



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Plants at Cleveland and Hudson, Ohio and Lanarkshire, Scotland



Compaction for 50% less per yard

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Contractors report:

- New Hyster Model D Tamping rollers get compaction at speeds to 15 MPH.
- High speed rolling cuts compaction costs by fifty per cent—or more!
- Large contact area of tamping feet—21 sq. in.—gives fast “walk out”!

Ask your Caterpillar-Hyster dealer for a demonstration soon.

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HYSTER COMPANY
 TRACTOR EQUIPMENT DIVISION
 P. O. Box 328 • Peoria, Illinois

ROADS AND STREETS, July, 1961

DUNE SAND—THE VILLAIN

Continued from page 52

tract. Holloway had brought in six Caterpillar model 80 scraper pans to use with crawler tractors in opening cuts. Later in the job, during those times when the going was tough for the self-propelled scrapers, these pans pulled by D8s and D9s made consistent yardage laying fill.

One such area involved 40,000 cu. yd. of embankment for an access road leading down from U.S. 12, paralleling the expressway at this point. This was a practical use of tractor-drawn scrapers: a short haul, plus a steep fill area which called for tractive power for best use of equipment.

The pans here were utilizing a borrow pit on the other side of parallel Route 12. The two flagmen earned their pay controlling the 4-lane traffic on this busy artery.

Another example of efficient application of the pans: As the roadways were nearing grade toward the southern end of the job, the pans were used to put down the last foot or two while obtaining the fill from hillsides and small dunes along the way. This latter technique served two purposes. Using this source of fill material meant that haul distances for the tractor-drawn units were reduced considerably; secondly, at least one major borrow pit had been rendered unusable by impassible ground conditions, and these small "auxiliary" fill sources proved a valuable aid in those areas where material was not needed in bulk.

In these circumstances, a tractor usually scalped the hill down to where it was negotiable by the tractor and pan, then helped to push the loading unit over the hump.

Final balancing of the fill at grade was done by motor graders equipped with aircraft tires inflated at 10 psi. The graders used 12-ft. blades instead of 14-ft. lengths as a concession to easier handling of the sand.

Holloway's objective was to grade any given area as quickly as possible so that the 3-in. gravel subbase could be put down. The reason for this was twofold: first, to retain the moisture already in the sand and, second, to hold the sand in place.

The moisture of the sand fill when spread on the grade was such that the specified 95 percent of standard density was ordinarily obtained just from the passage of equipment. Tests in the borrow pits showed that the moisture varied not more than 1 to 1½ percent at any depth. However it was feared that the sand would start to dry out if not covered.

Like most dune sand placed as fill, the lower lifts tightened up nicely but the top 10 to 12 in. would not compact. The base material, when rolled, provided the necessary compaction and also served another purpose. The extreme "fluidity" of this sand permits it to drift in certain areas when the winds off Lake Michigan reached a certain tempo. Putting down the base was the only sure means of keeping this sand "quiet" and the finished grade even.

To make money on a winter job in this sand, the contractor had to give all-out attention to equipment maintenance. The cold weather itself was not too great an obstacle; a squirt of ether into the manifold of a



Two of the tractor dozers spread fill while waiting to push scrapers through the fill area.



Loaded scrapers being pushed out beyond the borrow pit and started along the haul road by the pit tractors. While waiting for scrapers, the dozers bladed the area in efforts to get better footing.



All heavy equipment stayed "in the groove," to get best possible compaction of the sand and find easier hauling. Much better haul conditions existed in earlier phases of the work when colder weather held frost in the ground.

scraper in the morning, a nudge by a tractor, and the machine was on its way.

It was the sand, again, that played the role of villain. This fine sand, when wind-blown, covered a clean engine in minutes. The Holloway mechanics maintained strict preventive measures, such as keeping air cleaners as clean as possible, to minimize down time. Also hard on scraper engines and on gear trains was the hard running; on many days, from February on, scrapers had to operate constantly in first and second gear through the heavy sand.

The Holloway field shop had facilities for most repairs, including transmissions, but engines and other major work were sent back to company headquarters in Livonia, Michigan. As might be imagined, the casualty rate was high on tractor undercarriages. Track, rollers, bushings, etc., wore rapidly and the mechanics had to maintain a steady inventory of these parts.

Tractors were greased every day, with an oil change every 150 hours. During a noon-hour break, two mechanics made the daily check-up on two tractors assigned to pusher duty in a borrow pit. Points inspected and serviced included: torque converter, steering clutch, transmission, power unit, starting engine, final drives. Loose tracks were tightened and oil and water levels checked. Greasing not finished at noon was completed at 4 p.m., the end of the shift.

Among the Gulf lubricants carried on the service rig were 90-wt. transmission oil, 10-wt. hydraulic oil, 20-wt. high detergent motor oil and Gulflex grease.

Tractor radiators, filled equally with water and



Tractor-drawn pans were bringing in fill here for an access road down to the expressway. Final grade for this embankment reached the level of the lower telephone wire.

anti-freeze were set for 30-below temperatures, and actually early morning temperatures of 20-below were experienced with all equipment moving with no trouble.

Dan Holloway is president of Holloway Construction Co. Clyde Maylath was project engineer on this job for the Michigan state highway department under District Engineer, Paul B. Perkins. Project is in District 7. (Kalamazoo)

Highway Technician Course Succeeds in Michigan

The Michigan state highway department's student technician program this spring drew many students who took the examination required. Fifty students were selected to participate in the department's three-year program, which includes both on-the-job training and classroom study.

Students will work at various highway department jobs (drafting, design, survey, etc.) for six months at \$159 to \$184 per two-week periods. Then they will attend one of two participating colleges for another six months. Students will begin in July with on-the-job training at project sites to make full use of the summer season. Class work will start in December.

Any high school graduate is eligible to take the exam for this program. Graduates will earn an Associate Degree in Civil Technology.

According to state highway commissioner John C. Mackie, this program now in its fourth year has resulted in full-time employment for 26 graduates as department surveyors, inspectors or draftsmen.

MODERN soil-cement



Wray residential streets have 5" soil-cement base with 1½" plant mix top. Commercial streets are 6" soil-cement with a 2" top. In-place material required 5% portland cement by weight.

In Wray, Colorado...

Soil-cement pavement for 84 blocks of streets bid at 18% under competition

The lowest-cost, precision-built pavement there is! 75% of the materials are usually free!

When officials of Wray, Colorado, took bids for paving 84 blocks of streets, they found that soil-cement would save them 18% compared to the cost of flexible pavement. So satisfactory were the results that 8 more blocks were added to the original contract. Thus, 92 blocks (8 of which are commercial) are now paved with soil-cement.

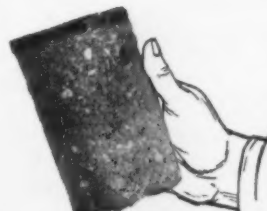
Soil-cement costs less to lay because the main ingredients can be

soil, gravel or broken-up blacktop. Mixed with portland cement and water, rolled solid and topped with a thin bituminous surface—the pavement's finished! It's the fastest-laid pavement there is. Experienced crews using modern machines lay up to one mile a day.

Maintenance costs stay low because soil-cement stays rigid. Inch for inch, soil-cement is the strongest pavement short of concrete. It provides beam strength that spreads traffic loads over the subgrade. Won't wash out or pothole.

No wonder, soil-cement is the

scientific answer for low-cost streets, roads, shoulders, subbases, airports and parking lots! Write for complete facts. (Free in U.S. and Canada.)



Gets stronger with age. Cores cut from soil-cement roads and streets show strength gains right from the start.

PORTLAND CEMENT ASSOCIATION

Dept. A7-28, 33 W. Grand Ave., Chicago 10, Ill.

A national organization to improve and extend the uses of portland cement and concrete

ROADS AND STREETS, July, 1961



Where highway construction is through swampy area, Michigan pushes and compacts fill base ahead of dumping scrapers. Spread is made at 8 mph, return at about 14 mph.



Working in dune sand, Holloway's Michigans "pick up" scrapers before they become stuck . . . push them through entire dump cycle and off fill onto return road at speeds up to 8 mph. Scrapers loaded weigh about 107,000 lbs, the Dozer weighs 57,700 lbs. This Michigan develops 290 hp; three other models are available—in sizes from 162 to 600 hp.



*With 4 million yards of pure sand to move on a major Interstate Highway project, this contractor decided to utilize an already available scraper spread. But units kept getting stuck in the soft footing. Then he replaced eight push-crawlers with four Michigan Dozers. **RESULT:***

Production up 40%... dozer cost down 65%

When Holloway Construction Company, Livonia, Michigan, won a contract for 7.8 miles of Interstate Highway 94, running through sand dunes and swamps alongside Lake Michigan, they were faced with having to move 4 million yards of almost pure sand. Should they use draglines and haul units . . . or utilize an already-available fleet of 26 self-propelled scrapers? Economics dictated the scrapers.

Fill production bogs down

"Right away we ran into trouble," reports General Supt Francis Morrell. "As soon as our scrapers would pull onto the fill, they'd bog down. Eight crawlers, assigned to spread, pull compactors and help out stuck scrapers, proved too slow to keep things moving. Also, operating in high gear was skyrocketing track costs."

"Then we replaced the eight 45,000 lb crawlers with four 57,770 lb Michigan Model 280 Tractor Dozers," Mr. Morrell continues. "Within a week, the rubber-tired units had increased production on the fill by 40% . . . and, reduced overall dozer fleet owning and operating costs by 65%".

7 to 8 mph dozer push clears scraper traffic jam

According to Holloway officials, the Michigans' speed was the major factor in increasing production. Before, crawlers were too slow to reach scrapers before they became stuck. Now, the Michigans are able to "pick up" loaded haul units as they enter the work area . . . and travel with them down the fill as they dump and spread at speeds up to 8 mph. As soon as one scraper has thus been boosted through its entire dump cycle and off the fill—a distance of about 350 ft—the Michigan quickly returns to pick up another. Meanwhile, the Dozer's big 29.5-25 tires compact the fill both ways.

Normal dozing passes achieve 95% compaction

"One 290 hp Michigan can get a loaded 19 yd scraper dumped and off the fill in just 65 seconds . . . and it gets back to the next scraper in 45 seconds," reports Supt Morrell. "Fill damage from scraper pumping action has been eliminated . . . and we are getting 95% compaction without the use of special equipment".

One Michigan's 10 hour production: 20,000 yds spread and compacted

Some of the fills on this job are 62 ft high . . . with cuts up to 92 ft deep providing 60% of needed material. Other 40% must be hauled from borrow pits up to 1½ miles away. Where scrapers are on the long hauls, Holloway officials report each Michigan Tractor Dozer is spreading and compacting between 6,000 and 7,000 pay yds (per cross-section measurement) per 10 hour day. *On short scraper hauls, 500 ft one-way, each Michigan spreads up to 20,000 pay yds per day.*

"Maintenance simple, availability excellent"

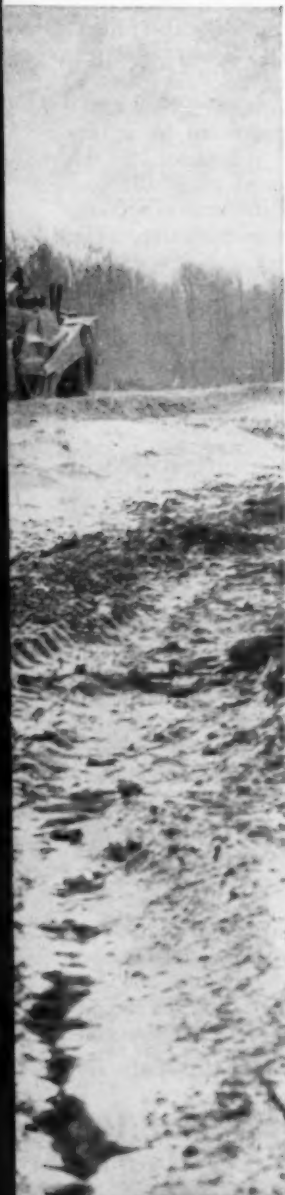
"We find Michigan maintenance simple . . . and availability excellent," reports Supt Morrell. "Their speed in boosting scrapers—plus their ability to stay clear of incoming haul units—has eliminated all congestion on the fill. We feel our four Michigans have given us a new approach to fill spreading and compacting!"

Michigan is a registered trademark of
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Construction Machinery Division

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Mixing cement treated base with a Pettibone-Wood Traveling mixer for an experimental section.

New Mexico Tests "Upside Down" Flexible Designs

**Bituminous
Roads And Streets**

Bituminous features appear between pages 100 through 111

"Upside down" pavement designs are included in four of the variations in a series of test sections built recently by the New Mexico state highway department. The project located on US 64-84-285 in the Tesuque-Pojoaque area was planned to develop data for producing more durable and smooth-riding roads from prevailing soils and aggregates. The Bureau of Public Roads participated in the project. Inspections were first made in August, 1960, following soon after completion. The project is the subject of a report, "Comparative Studies of Various Combinations of Treated and Untreated Bases and Subbases for Flexible Pavements," given by Charles W. Johnson at the Highway Research Board's annual meeting, January, 1961. Johnson was chief of the materials and testing laboratory at the time the project was devised, and is now construction engineer.

The project included nine 2,000-ft. sections constructed by a very cooperative contractor, T. H. Brown, as part of an 8-mile contract. Each of the special sections has a different composition. The bottom layer of the first section contains 4 percent of portland cement as a treated course. This formula is also used in other sections, but the middle layer varies, with one including non-plastic material and others a material of some plasticity.

In the recent past the standard road construction in New Mexico has included a bottom layer (sub-base) of granular material, a middle section (base) of cement-treated material, and a topping of asphaltic concrete. The "upside down" tag was given certain of the experimental sections because of the adoption of cement treatment for the subbase instead of the base. The concept of building greater strength in the layer immediately over a weak subgrade, instead of making the layers progressively stronger and more stable upward to the surface, is a reversal of accepted principle.

The state had begun in 1958 to use cement extensively to treat base course aggregates. Pattern cracking soon appeared, causing much concern. On one such job the con-

Continued on page 107



Seal Coating with Cationic Bitumuls produced uniformly fine results in spite of early showers

CATIONIC BITUMULS SPEEDS SEAL COATING IN TACOMA

The City of Tacoma, Washington, has two major sources of street maintenance problems. First, some forty miles of very old (1890-1915) sheet asphalt surfaces. These are now badly cracked and extensively patched. Second, several hundred miles of streets that have only a light bituminous treatment. The ever-increasing traffic load is starting to cause trouble on these.

In the past, the City has settled for continuous patching on the sheet asphalt; and Seal Coating of the light bituminous arterials, using either anionic emulsions or cutbacks. The Seal Coating required closing the streets to traffic for long periods; and weather was a constant threat, restricting the work seasonally.

City maintenance forces were quick to see two major advantages of Cationic Bitumuls when it was first introduced. A—This material

had a natural affinity for the cover aggregate being used. B—The rapid-setting characteristics sharply reduced the danger of "wash-off" from rain. (When showers actually occurred within two hours of job completion, there was no damage!)

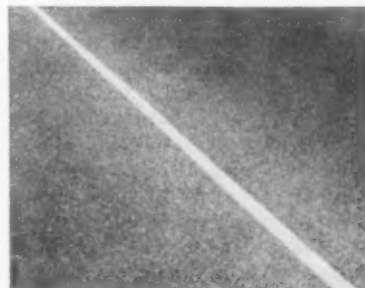
Based on earlier work the City was able to "field" a well-integrated Seal Coating team. Cationic Bitumuls sets rapidly so that Seal Coating operations were co-ordinated even more closely. Both the cover-stone truck and the pneumatic roller could follow very closely behind the distributor!

The Seal Coating operation has now been extended to the "ancient" sheet asphalt pave-

ments. Here it prevents the break-up action that made earlier patching necessary.

Using Cationic Bitumuls, streets are closed to traffic a much shorter time; and the work season begins much earlier in the year.

Discover for yourself the ability of Cationic Bitumuls to extend the work season; and to coat and hold most aggregates—even those normally regarded as "difficult". Bitumuls Engineers in our nearest office will supply full information; and will arrange for you to see a Cationic Bitumuls job in your area.



Close-up view of a Cationic Bitumuls Seal Coat. Note uniform cover-stone retention



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Hauck tar kettle in use by Pennsylvania Highway Department.

The Familiar Asphalt Kettle Goes Automatic

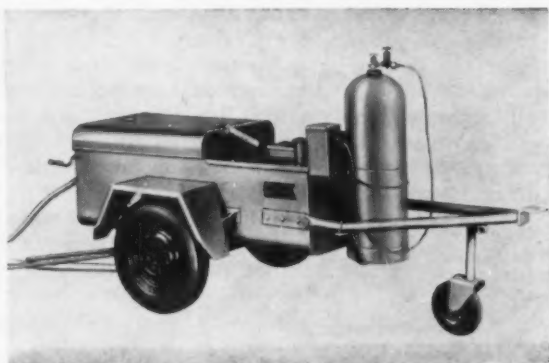
Automatic temperature controls to insure against overheating of asphalt have been specified for nearly 300 trailer kettles purchased by the Pennsylvania department of highways. The 115-gal. units, for use in the department's road maintenance, were so equipped in recognition of the importance of heating control to the securing of a durable asphaltic binder. The units purchased were Hauck kettles equipped with mechanical throttling gas controls, self-actuating and designed to withstand rough operations.

Various types of asphalts, including the "tight spec" varieties, used in road construction and repair, have various optimum temperatures for best results in application.

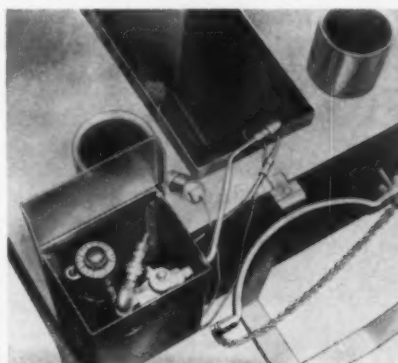
These temperatures range up to 450° or 500° F. The units purchased in Pennsylvania have controls capable of being set for any maximum from 200° to 600° F.

The heating controls on the units were manufactured by The Partlow Corporation. As explained by Charles W. Pflieger, research and development manager of this firm, when the specified maximum asphalt temperature is reached in kettle operation, the control problem is to promptly and effectively reduce or cut out the burner flame. After the material temperature has dropped from the desired point, the control should automatically raise or restore the flame until the proper temperature has again been reached.

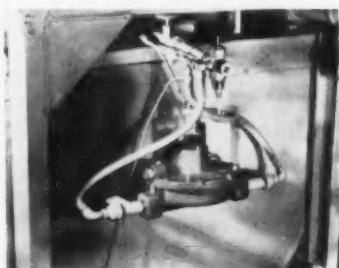
This can be accomplished with either modulating or on-off types of thermostats. For the units made up for Pennsylvania, Hauck selected a modulating type (Partlow Model 28) capable of regulating the flame of the L-P gas burner so that it will maintain the asphalt temperature at a given desired level. On-off types also are suitable when a relatively constant temperature is desired, but they permit somewhat more temperature variation from the set-point, according to Pflieger. The on-off type also is capable of preventing overheating and is available on various makes of kettles. The move to mechanical automatic control for trailer kettles represents something of a "trend upon a trend."



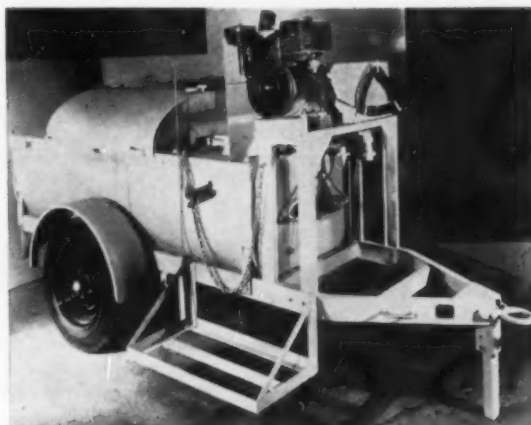
A Hauck asphalt kettle equipped with Partlow Model 28 throttling gas control.



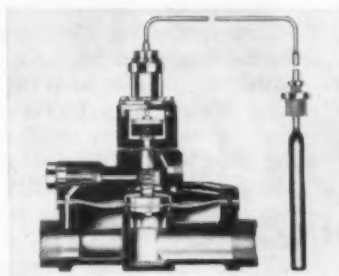
The Hauck trailer's control box housing the Model 28.



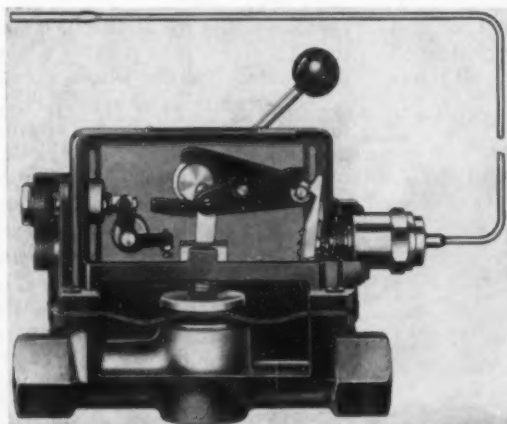
Closeup of the Model 86 on an Aeroil kettle.



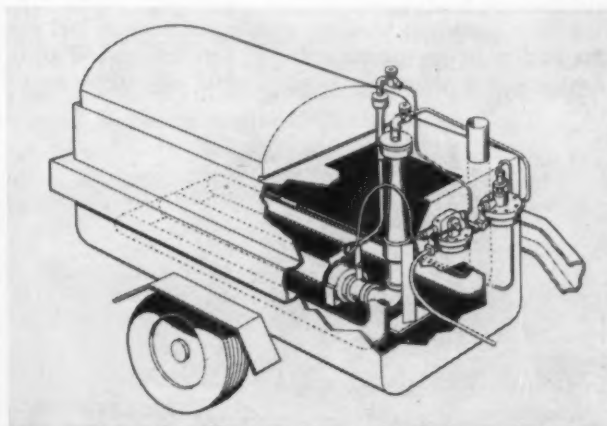
This Aeroil LP tar kettle is equipped with a Partlow Model 86 on-off mechanical gas temperature control shown mounted on the front of the trailer body and beneath the engine.



Cutaway illustration of the Model 86.



Cutaway illustration of the Model 760.



Schematic of the Ransome "matched component system" for conversion of kettles to automatic control. The system uses a Model 86 control and a Partlow Model 760 pilot control.

Until recently, keeping asphalts at specified optimum temperatures required an inspector to check temperatures at regular intervals. This used up valuable man-hours and the system was subject to human error. Since contractors post bonds on their work, human error represented a potentially costly risk.

Now, however, the use of automatic temperature controls for kettles is reported to be increasing rapidly. The Partlow experts foresee it as standard on all asphalt-handling equipment within five years.

Two developments were primarily responsible for the turn to automatic control: the growing use of tube-fired rather than bottom-fired kettle equipment, and wider use of bottled gas (liquefied petroleum, propane or butane).

Tube-fired equipment, the control makers explained, is more readily adaptable to automatic con-

trol because tube-firing permits running temperature gauging devices along the tubes to obtain a true reading. Where the bottom-fired principle applies, heating elements are physically separate from the kettle itself and thus a true reading of asphalt temperature would be more difficult to obtain.

Growing use of gas has spurred popularity of automatic controls since gas permits a high degree of flame regulation. For effective automatic control virtually any size flame must be obtainable. Gas-burning equipment does permit a fine degree of regulation, all the way down to a mere candle flame if desired.

Automatically-controlled asphalt heating first became widespread in the West. Pflieger notes that this method then spread into the Middle West and now is being widely

accepted in the East. Mechanical rather than electric controls are favored to avoid dead batteries and down-time from this cause. For this reason another manufacturer, Aeroil Products Company, Inc., has begun offering asphalt kettles with on-off type controls (Partlow Model 86).

Still another variation of mechanical control is used by the Ransome Torch & Burner Company in a matched-component system—consisting of a burner and two controls—for converting tar kettles to automatic control. Ransome uses a Model 86 in conjunction with a Model 760 pilot control which will shut off the entire gas supply promptly in the event of pilot failure. Its sensing bulb is in contact with the pilot flame and the valve in the 760 permits the flow of gas to the burner only when the pilot is operating.

Airfield Apron Sealed Against Jet Fuel

Effective sealing is reported for an eight-year-old asphaltic concrete apron at Scott Air Force Base. The sealing has made it possible for jet fighter aircraft to taxi and refuel without danger of damage to the pavement surface through fuel spillage.

Protection of the surface was achieved through application of 13,000 gal. of Koppers coal-tar pavement sealer to 43,000 sq. yd. of asphalt blacktop. The St. Louis base is international headquarters of the Military Air Transport Service.

The original pavement, according to Koppers, was showing damage

from weathering and from fuel spillage. Deterioration from spillage had been a constant problem. Since application of the sealer late in 1960, however, there has been no indication of softening of the pavement from spilled fuel, according to the applicator.

The Koppers Regular Pavement Sealer was applied as a slurry, with a mixture of 6 lb. of sand per gal. of sealer. Before the application, large cracks in the asphalt were repaired; soft spots which had become saturated with jet fuel were cut out and patched; and all areas were cleaned with a detergent to remove all traces

of both oil and kerosene.

Overall application was made with a specialized distributor tank truck, fitted with agitator blades within the tank to keep the sealer-sand mixture at a proper consistency. A water-spray attachment on the front of the distributor truck was used to wet the asphalt surface, immediately ahead of the sealer application.

The complete sealing job was performed in two applications, two to three hours apart.

Main reason for addition of sand to the sealer was to provide a non-skid surface for the wheels of maneuvering planes, and as an abrasive surface to guard against unusual wear.

The Pavement Sealer was applied by Iowa Concrete Breaking Company of Des Moines, Iowa. Morris L. Sheetz, company secretary, acted as general superintendent. The treated apron area is part of the facilities of the 1405th Air Base Wing commanded by Col. W. C. Armstrong. Mission of the 1405th is support and service for MATS and other tenant units. The entire Military Air Transport Service is under the command of Lieutenant General Joseph W. Kelly.

Area of sealing operation at Scott Air Base.

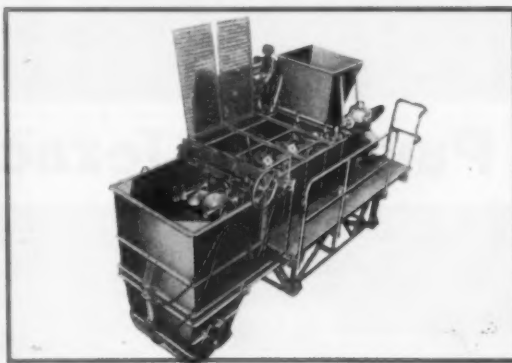




Model 828 shown has mixer that hydraulically erects itself in two minutes. Capacity: more than 600 tph. Also available in portable and stationary models.



Model 824 produces stabilized base mix from 80 to over 200 tph.



Twin shaft pugmill has large surge hopper, precision water pump and meter, no liner plate replacement costs, hydraulically operated clamshell gate. Diesel or electric power.

High capacity stabilization plants give controlled mixing...less maintenance

Barber-Greene's stabilization plant line makes central plant base mixing most advantageous for greater capacity and control of mix. Plant Model 828, with a range from 200 to over 600 tph, is available as a stationary, portable, or self-erecting mixer unit. For smaller jobs Model 824 produces from 80 to over 240 tph.

All stabilization plant components, including portable or permanent conveyors, tunnel conveyors,

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ROADS AND STREETS, July, 1961

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Here's an advantage of using Texaco Asphaltic Concrete you may be overlooking: you can pave thoroughfares at night—let heavy traffic ride over them next day.

That's how Union Paving Company, contractors, paved the Admiral Wilson Boulevard in Camden, New Jersey. This busy boulevard, part of U.S. Route 30, is used all day long by thousands of cars entering and leaving Philadelphia via the Benjamin Franklin Bridge.

Between 8 PM and 5 AM, over a period of several weeks, highway crews spread 113,000 square yards of heavy-duty, hot-mix Texaco Asphaltic Concrete. They laid it in two courses (combined thickness: 3") and completed rolling. The surface mixture quickly cooled to atmospheric temperature—allowing heavy daily traffic to pass over the highway without detours or delays.

Texaco Asphalts and Surfacing Materials offer contractors a wide choice of pavement types for roads and streets and for airport runways and parking areas. If you'd like to know more about them, send for our two informative booklets: "Road Building with Texaco Asphalt" and "Plant Mixed Texaco Asphalt Pavements." Write: *Texaco Inc., Asphalt Sales Division, P. O. Box 2332, Houston 1, Texas.*

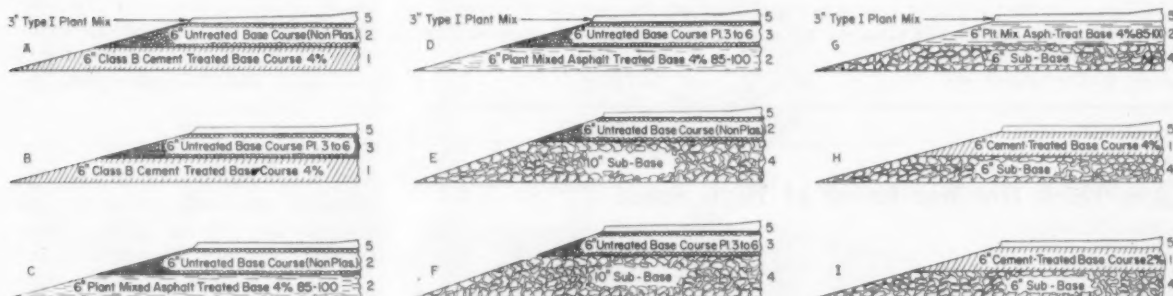


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Variants in cross-section involved in the New Mexico arterial test project. (Here and Below.)

Here cement is being deposited evenly in a notch in a measured windrow, preliminary to the mixer pass which will add measured moisture and thoroughly mix.



'UPSIDE DOWN' DESIGNS

Continued from page 100

tractor (Brown) became alarmed over such cracking appearing up through the plant-mix surface. He was given permission to change his operations and process cement into the subbase aggregates, rather than the base. His idea, which seemed a good one to the engineers, was that this construction would give immediate protection to the subgrade from surface moisture; and it would afford better compaction of the untreated base course to follow, since rolling would be against a firmer foundation. Also it was felt that there would be less reflective cracking in the surface due to the cushioning effect of the intervening untreated base layer.

Also a point of importance was that the time limit specified in New Mexico for processing cement-treated courses was not long enough to permit the blade operators to secure enough smoothness to insure a smooth-riding road during placement of the plant mix topping.

The reflective cracking pattern here discussed, the New Mexico highway engineers point out, has not been considered necessarily a sign of acute pavement distress, but the phenomenon certainly wasn't considered desirable for long-run durability.

The state department had previously used the "upside down" construction on urban projects, where leaky water lines or poor drainage weakened the underlying soil and required a bridging-over effect in

the subbase. The experience here has been satisfactory, a factor which favored the try-out of contractor Brown's suggestion.

The experimental sections adopted for the US 64-84-285 job included the upside-down construction. Also, for comparison, pairs of sections with untreated base and subbase; base course treated with 1½ percent of cement and subbase with 3 percent cement; and base course with 1½ percent cement, placed over untreated subbase. The surfacing throughout consisted of 3 in. of plant mixed asphaltic concrete, except for one section where 1½ in. of mix was placed over an untreated base and a subbase treated with 3 percent cement.

Mr. Johnson in a recent letter to Roads and Streets reported that, after a year of traffic use, the upside-

New Mexico Experimental Sections Recommended Specifications: % Passing

Sieve Size	1 Base Course Cement Treat.	2 Base Course Untreated & Asphalt Treat.	3 Base Course Untreated P.I. 3 to 6	4 Sub-Base Controlled Gradation	5 Plant Mix Type I 'B'	6 Min. Agg. Shoulder Treatment
2 in.				100		
1 in.	100	100	100	70-100		
¾ in.	85-100	80-100	80-100		100	
½ in.						100
¼ in.					70-100	
No. 4	40-70	30-60	30-60	30-55	40-65	0-20
No. 10	30-55	20-45	20-45	20-40	30-50	0-4
No. 40					15-30	
No. 80					8-20	
No. 200	6-15	4-12	4-12	4-12	4-9	
L.L.	25 or less	Sandy	25 or less	35 or less	Sandy	
P.I.	6 or less	Non-plastic	3 to 6	6 or less	Non-plastic	
L.A. Wear	50 or less	50 or less	50 or less	—	40 or less	40 or less

1—Cement treated base course to be produced from Pit No. 58-126-S.

2—Untreated base course and asphalt treated base course to be produced from Pit No. 58-124-S. (Non-plastic material.)

3—Untreated base course with P.I. from 3 to 6 to be produced from Pit No. 58-126-S.

4—Subbase controlled gradation can be produced from Pit No. 58-124-S or 58-126-S.

5 & 6—Plant mix and mineral aggregate for shoulder treatment to be produced from Pit No. 58-124-S.

down construction seems to have been of value in preventing the reflective cracking. Periodic inspection will continue, with the objective of developing data useful in improving New Mexico road designs. Particularly the hope is to build against future distortion and roughness. Guarding against degradation of aggregates is one phase of the problem in all the experimental sections. Various stabilization variants will be tried, some engineers feeling that lower amounts of cement are preferred, and others having asphalt stabilization in mind.

In the cement treated subbase or upside-down sections, it is felt that intrusion of underlying soils into the pavement courses will be lessened. The engineers hope to determine the rate of such intrusion and of any degradation of aggregates, and the amount of such occurrence before surface distress is observed. Also, since there has been so much discussion over reflective cracking, the staff hopes to determine if this defect contributes to distortion and roughness developing in the surface.

Lays Thick Hot-Mix Layer at High Speed



One of the major pieces of machinery employed to place asphaltic paving on the expanded facilities at Baltimore's Friendship Airport was this new "super" paver. Equipped with a 12-ton capacity

hopper, the rubber-tired unit paved more than 110 feet per minute in 2 in. thick, 12 ft. wide passes.

The PF-180 paver, designed and built by Blaw-Knox Company, was used by the Bituminous Construc-

tion Co., Baltimore. E. Stewart Mitchell, the firm's president, said the machine proved highly maneuverable, placed a smooth mat, and—through its high volume, folding sides hopper—reduced truck waiting time.

Close Estimating

Of the Montana state road jobs finalled out in 1959 and 1960, according to a bulletin from the highway commission, 28 jobs analyzed showed an over-run of the excavation quantities and payment compared to the bid-price. This was due most often to a higher shrinkage in the material than anticipated, or some unforeseen condition that required additional work. There were 14 jobs that underran the contract price. On the 42 jobs analyzed, a total of 23,590,000 cu. yd. of excavation was planned for, and the actual excavation came to 24,982,000 cu. yd. 63 other jobs were not analyzed.

A. B. Cornthwaite Joins Asphalt Institute

Appointment of A. Blake Cornthwaite as Managing Engineer for the Asphalt Institute's Atlantic-Gulf Div., was announced by Dr. J. E. Buchanan, Institute president. Mr. Cornthwaite has been head of the Materials and Tests Division, Virginia Department of Highways. In his new position Cornthwaite will direct the engineering activities of the Institute in a 20-state area. New division headquarters will be established at Washington, D.C., at 1901 Pennsylvania Avenue, N.W. A district engineering office will be maintained in New York.

Cornthwaite's career covers nearly 32 years with the Virginia de-



A. B. Cornthwaite

partment. Among his organizational activities he is a director of the American Society for Testing Materials, and has served as member and chairman of numerous committees since 1952. He also has been chairman of the Committee on Materials, American Association of State Highway Officials, and a member of the Highway Research Board Executive Committee. In addition, he serves as vice chairman of the Bituminous Division of the AASHTO Committee on Materials, and is a member of the American Chemical Society.

THE THEME OF THE SEVENTH NATIONAL CONVENTION of the Prestressed Concrete Institute to be held in Denver, October 15-19, will be: New Opportunities in Structural Design.

It is expected nearly 1,000 persons, including delegates, architects and engineers will attend the convention to be held in two of Denver's largest hotels, the Brown Palace and the Cosmopolitan. The convention is being held in cooperation with the University of Colorado.

Soils Summer Course

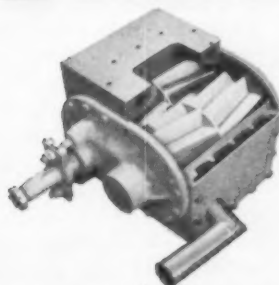
A two-week study program on "The Shear Strength Behavior of

Cohesive Soils," will be given from August 28 through September 8, by the Massachusetts Institute of Technology, at Cambridge. The program is designed to familiarize educators, researchers, and practicing engineers with latest developments in this field. A similar program two years ago attracted 100 participants.

Information on the course is obtainable from Professor T. William Lambe, Soils Engineering, M.I.T., Cambridge 39, Massachusetts.

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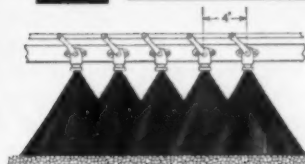
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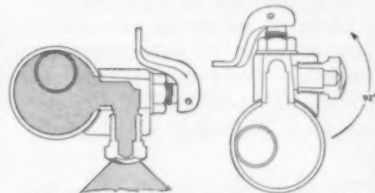
Etnyre FX-500 is the *only* distributor with a heat-jacketed pump. Engine exhaust is directed into jacketed pump case which surrounds pump impellers, then into intake valve above pump after passing through ducts in pump case. Suction on top and discharge at bottom make pump self-draining — no low points to trap material. Eliminates fire hazard of flame heating from burner.

2 THE BEST SPRAY BAR



New lighter weight bar has full material circulation with 92° rotation up from spraying position. Complete valve drainage . . . NO possible drip! Pressure circulation assures instant and complete shutoff . . . clean starts and stops. Uniform spray from one end of the bar to the other.

Triple lap material coverage. With nozzles on 4" centers, spray from each nozzle overlaps two other sprays.



Cross section shows new TUC Bar with valve and nozzle in spraying position.

Cross section shows bar rotated 92° — valve completely drained.

Notice that no part of valve extends into bar to reduce circulation.

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By H. G. Nevitt

The Economic Aspect of Multilayered Road Structures

While technical requirements sets limits and often completely determine some phases of the design, there are usually many decisions within this technical framework which must be based on economic considerations.

This is perhaps unfortunate for two reasons. The first is that these decisions are often difficult, yet the quality of the engineering may be established by them. The second is that most engineers display more interest as well as capability in technical than in economic matters. They tend to resemble scientists more than business men. It seems obvious that every engineer should correspondingly attempt to offset these difficulties of decision by extra attention to the economic aspects of his work. And probably no phase of engineering requires this more than flexible pavement construction, particularly multilayered structures. The economics are often far from clear, and usually the comparative costs for any operation are as likely to be set by the overall situation as by its particular characteristics. We cannot clarify this problem by specific rules, but perhaps some discussion will be helpful.

The basic technical situation has been outlined in previous issues of *Roads and Streets*. Essentially it was made clear that it is feasible, if economically desirable, to reduce both the frictional and tensile resistances inherent in the layers as their depth in the road structure becomes greater, though with some restrictions on the frictional de-

crease if any available tensile strength is to be utilized. Cost reductions can usually be obtained by such decreases, and the most common problem is to determine the true situation with regard to costs. There are then two facets to the cost reduction problem, namely the design, and its actual effect on costs.

Aggregate cost reduction is generally accomplished in two ways. The first is through reduction in the processing operations on the aggregate; the second through the substitution of cheaper source materials which are not susceptible to upgrading by processing.

A typical example of the first situation is a riverbank gravel which can be improved by screening, or by crushing combined with screening. The first makes possible a higher resistance; the latter further augments the inherent resistance of the better gradation. The other situation is typified by the substitution of a sand or soil which cannot be improved beyond some limiting value by processing, but if used in layers where its resistance value is sufficient offers savings.

The variations possible in these situations are almost innumerable, but all must be given consideration to some degree.

Cost reduction is possible in other ways. An obvious one is to save on asphalt in layers that do not require cohesion, or will not exhibit tensile strength even if it is present. Another is saving by the use of cheaper aggregate through stabilizing it with asphalt, which usually also gives benefits from increased

cohesion. Still another possible route for savings—one often neglected—is to decrease the structure thickness somewhat through more effective stress distribution by the layers, with a resultant net savings even if the more efficient layers have a somewhat higher unit cost. The last approach implies the use of a design technique which fully reflects all the resistance properties present.

The other aspect of multilayer design, namely determining the true cost differences between alternate designs, may offer greater difficulties. A normal low quality aggregate may not be less costly than additional good aggregate produced from a source which must be utilized in an upper layer for technical reasons. Here setting-up and similar costs come in; likewise the effects of increased production from higher through-put equipment if fewer sources are utilized. Obviously the availability of such equipment and many other factors are involved. In many cases only a detailed total job cost study of several possible alternate approaches will tell which actually is cheaper; the utilization of average unit costs for each operation will not necessarily lead to the correct decision.

Naturally some solutions tend to appear frequently as the best answer. Care must be taken that they are not in consequence assumed to be the right answer every time. A few will be discussed following.

A very favorable situation often exists with gravel pits (usually in terrain of hilly or mountainous origin, past or present) of large volume

and an extreme range of gravel size. The contractor can install a crushing plant for the oversize, along with a screening unit. If the quantities are in at all correct proportions the following layers can be recombined from the screened fractions to balance out the production: a layer of predominantly crushed material; a layer of partially crushed material; a layer of screened material; and a layer of pit run gravel. Production balance in the above approach can usually be through the selection of the layers to be asphalted. If crushed material is short, the use of asphalt further down—that is, of black base—will bridge the gap. Usually this situation prevails, and with heavy traffic application may show outstanding economies: this is one reason for the rapid increase on black base construction today.

An analogous situation results from the proper use of filler and asphalt with many sand aggregates. By using just the two supplemental materials, but juggling the quantities in different layers, excellent yet economical construction can be obtained.

Selection of the binder as well as the layers in which it is used requires judgment. Roadmixed cut-backs with black bases are popular in some areas of the country. Yet the apparent savings from this cheaper approach may not actually be obtained. If a hot-mix plant of the proper capacity is present or can be utilized, a regular hot-mixed black base at an incremental cost may really be cheaper, and there is no question as to when the desired tensile strength in the binder will have appeared. On the other hand a lower level base course, asphalted primarily for stabilizing and waterproofing purposes and built well in advance of the later pavement, might wisely be constructed by road mix methods.

It might be well to repeat here the point given emphasis in the first item of this series—namely, that simplicity may still be more desirable than too great complexity in the design, despite the theoretical advantages of numerous layers. Almost always a reasonable compromise can be found between the two extremes: one of the pleasant aspects of highway engineering is that it is a field in which imagination, knowhow and judgement can be

used to produce results which are clearly both better and cheaper.

We hope we have made it evident that the approach to sound economics is some imaginative visualization of the alternative possibilities in the design and construction, followed by a careful and realistic comparison of the total cost for each available route, so that the final overall decision will represent the economic optimum. Technical as well as economic alternatives are usually available; clearly highly standardized construction, mechanical

thinking and in general the lack of understanding of fundamentals will result in appreciable penalties to those paying for the results to be obtained. Multilayer construction is typical of many engineering problems where neither a monument to the engineer, ability to dream up something unusual regardless of the cost, nor a dull repetition of standardized thinking, represent proper adherence to the engineer's duty to provide the most in results for the least in money.

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Standard Steel Works, Inc. NORTH KANSAS CITY, MO.

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This Buffalo-Springfield Kompactor was the mainstay in securing high densities in the reconditioned subgrade.



Paired Cat 14 motor graders windrowing the top 6 in. of the subgrade as a step in subgrade preparation. The layer thus exposed was compacted to 95 percent.

GOOD 'UP-FRONT' CONTROL

Continued from page 55

Third, the subgrade was prepared in accordance with Iowa specifications for Interstate highway paving. The subgrade was scarified to a depth of 6 in. and to a width not less than 6 in. beyond the edges of the subbase (24' plus 1.5' plus 1.5' plus 6" plus 6", or 28 ft.). With 2 in. maximum size soil particles permitted in the subgrade, the contractor made passes with a Pettibone-Wood Preparizer to break up over-size. A Pulvimixer was used to assist in mixing, pulverizing and preparing the material for compaction. In conjunction, the subgrade was brought to within 5 percent of optimum moisture. It was shaped and compacted to at least 95 percent of standard Proctor density and to a profile tolerance of 0.05 ft.

Care was taken to sprinkle or aerate to maintain optimum moisture, and laying out and rolling was done in 2 in. lifts to bring the level up uniformly. This involved compaction with pneumatic rollers and a Buffalo-Springfield segment-shoe Kompactor, the latter serving as a test roller. Any weak spots found were corrected.

Sometimes removal to a depth greater than 6 in. was found desirable. Such removal was paid for as an extra item when done at the engineer's order.

Sometimes this procedure still left an unsatisfactory subgrade due to weather, or poor underlying mate-

rial. In such situations the area was rescarified, the material windrowed to one side, and brought back and recompacted.

After all windrowed material had thus been put back in place, came the final work of evening up and securing the utmost uniformity and trueness. Two motor grader operators worked by stringline and constant checks against the bluetops, with signals devised to alert the operators to high or low areas. The subgrade evenness tolerance of 0.5 ft. was met to the satisfaction of the inspectors.

All this time, the chief inspector and his inspectors worked closely with the contractor's men to check line, grade and density of the subgrade. As a result of the foregoing procedure it was seldom necessary to do any further reworking. One detail considered particularly important was the avoidance of even temporary ponding areas that might produce saturation or uneven wetting from either the sprinkling or sudden showers. The entire handling represented an example of cooperation between contractor and engineer, under the new awareness that uniformity is a new golden rule of subgrade preparation.

Subbase preparation methods by placing and compacting the 4 in. thick granular subbase followed

Continued on page 115

ONLY MAGINNISS VIBRATING SCREED



gives you these *Plus* BENEFITS

- ★ Engine can be started and warmed up with vibrator disengaged.
- ★ Centrifugal clutch allows engine to idle — No unnecessary starting or stopping.
- ★ Remote throttle control permits operator to select desired vibrating frequency from 4000 to 8000 vpm, without moving away from pull handle.
- ★ Vibrates and semi-finishes concrete while striking it off — ALL in ONE operation.
- ★ ALL Vibration is in the beam — Springs isolate engine and end dollies.
- ★ Custom-made Beams up to 60 feet long with any crown can be furnished. Standard Beams are straight.
- ★ Only Screed Beam utilizing Laminated wood. It is stronger, more rigid, less apt to warp, and lighter in weight than solid wood or metal screed beams.
- ★ Dolly rollers have removable flanges for use on adjacent slabs.
- ★ End dolly design permits 8' variable width adjustment quickly, even while operating.
- ★ Telescoping handles provide adjustable height to suit operator.
- ★ Unique clamping design of beam in end dollies permits fine vertical adjustment. Vibration of forms is eliminated.
- ★ Enclosed dual V-Belt drive, Less downtime.
- ★ Retractable form scraper — Keeps forms clean for easy forward movement of Screed; automatically raises when backing up.
- ★ Pick-up handle on each dolly makes it easy to lift and carry.
- ★ Electric motor can easily be substituted for gasoline engine. Holes in plate are drilled for both.
- ★ Power Unit, End Dollies and Screed Beam can be purchased separately.

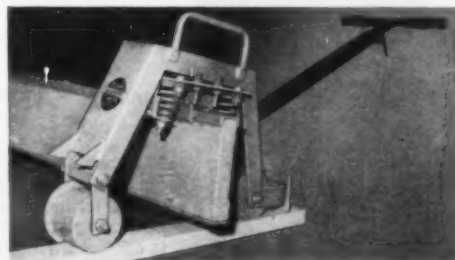
WHERE TO USE IT:

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SPRING MOUNTING

Spring mountings isolate the end dollies from vibration. Vertical adjustment of beam keeps it from vibrating the forms. Whether striking off or backing up, the screed moves easily along on four rollers — two on each dolly.



EASILY RAISED FOR BACKING UP

Downward push on the pull handles causes the rear rollers to swing forward — automatically placing the beam in "raised" position for backing up. Then a pull on the handles moves the rollers back and up, placing the beam in normal operating position.

WRITE FOR COMPLETE INFORMATION — or call your nearest MAGINNISS Distributor. He's listed under "Contractors Equipment" in 85 principal cities.



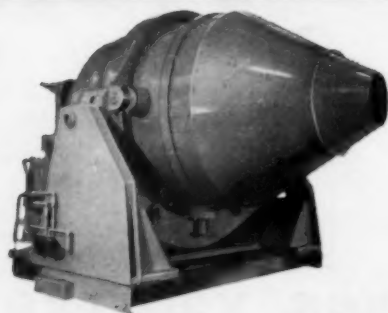
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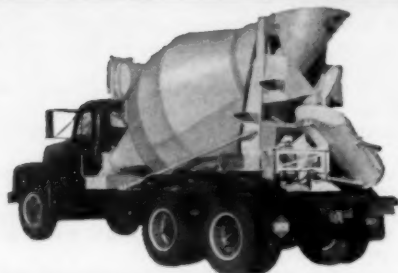
A complete line
of equipment for
the mixing of concrete
and its delivery
to the job-site



TILTER MIXERS — Heavy-duty design. Proved in performance on world's largest construction jobs, and in central ready-mix plants. Capacities: 2, 3, 3½, 4, 6, 7½, 10 cu. yds.



READY-MIXED PLANTS — Complete plants including Smith-Gregco bins, batchers, conveyors, and silos are engineered for high production, complete electronic control throughout.



TRUCK MIXERS — Only Smith offers you the choice of gear or chain drive, with exclusive torsion bar frame construction. Design permits larger legal payloads, provides stronger, more rugged unit. Specially engineered aluminum-and-steel mixers are now available for even greater payloads within legal limits.



TURBINE MIXERS — Can bring high-speed mixing to existing plants with no costly extras or alterations. Turbine's low headroom requirements plus high capacity permit substantial savings in new-plant costs. Produces any desired slump concrete. From ½ to 3 cu. yds. capacity.



THE T. L. SMITH COMPANY
Milwaukee, Wisconsin / Lufkin, Texas

Affiliated with Essick Manufacturing Co., Los Angeles, California



Material for the 4 in. select base being spread by a Blaw-Knox base machine, and initially compacted with a Tamp-o-pneumatic and Ferguson steel wheel roller.

GOOD 'UP-FRONT' CONTROL

Continued from page 112

closely behind the subgrade crew. This material's gradation limits are here tabulated. Placement was by Blaw-Knox base machine and compaction was done to 100 percent of standard density with a tandem steel roller and a rubber-tired roller. Moisture content was also watched closely in this material in the interest of uniformity as well as of meeting spot density tests.

The base was left about 1 in. high of final elevation as a Cleveland form grader made its pass and the form setters moved along. Use of a Cleveland form tamper was one of the final details toward securing a good profilograph grading for the finished job.

Working between the forms, the final preparation was handled by a motor grader, a pneumatic roller, and a seldom seen feature—dump trucks between the forms receiving



Steel forms were set to stringline grade and bedded down with a Cleveland form tamper.



Following the subgrader, a crew first laid one mil thickness polyethylene sheets, held in place by shovelfuls of concrete. The crew members then split up, placing dowels and also strips and tie bars for adjoining third lane at this location.

belted material as the Blaw-Knox subgrader shaved the base down to final grade. The excess material was brought to the proper moisture content and reused in the subbase ahead. (see photo at beginning of article.)

Granular subbase material was tested for compliance with compaction under provisions of AASHTO T-99. Density tests were taken ap-

proximately every 500 lin. ft. of road. Moisture was controlled at the pugmill at the production plant within specification limits. This reduced the effort necessary to acquire proper compaction on the grade.

Working behind the subgrader a Ferguson steel roller and sprinkler truck made their necessary passes. Then the subgrade was covered

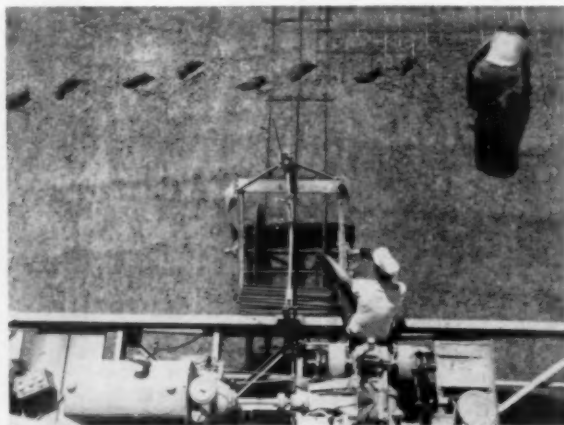
with one-mil thick polyethylene plastic sheeting. Care was taken to tack the sheeting down (using shovelfuls of concrete) and maintain it in an undisturbed condition prior to and during placement of paving concrete.

Excess subbase material was used to fill low spots ahead, and every effort made to achieve as even a

Continued on page 120



Three-man crew placing keyway form and tie bars.



Worker sitting on the leading edge of the second Blaw-Knox spreader fed centerline tiebars into an automatic spacer.



Increase roadway and runway safety with Transite Underdrain Pipe

Eliminate the contributing causes of sags, holes and similar hazards to under-wheel safety with perforated Transite® Underdrain Pipe. Its superior performance in groundwater control has been proved in many county, state and federal installations.

Transite Underdrain has an exceptional weight-to-strength ratio. The coupling, used to form the joints, assures a flexible yet reliably joined system. This, combined with long (10' and 13') lengths, keeps the pipe aligned and allows the line to ride with normal soil movement without disturbance to the system. Transite's smooth inner surface and low coefficient of friction assist the flow of water and reduce the opportunity for water-borne silt to build up on the invert. Thus, the accurately sized, drilled and located perforations can perform their function of letting groundwater into the line at a maximum flow rate.

For full details, send for data sheet TR-246. Write to Johns-Manville, Box 14, RS-7, New York 16, N. Y. In Canada: Port Credit, Ontario. Cable address: Johnmanvil.



JOHNS-MANVILLE 

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C H E V R O L E T

OLD PRO

That truck engine on the opposite page is one of Chevrolet's famous Thriftmaster 6's—and if it looks a bit battle-scarred, there's a good reason! This one has just turned 230,000 miles, working for Earl McDaniel of Dallas Texas, on a hustling round-the-clock air mail delivery job. *And here's the stopper: this engine has never been overhauled. It has required only routine maintenance over all those miles.* That, you'll agree, is professional truck power at its dollar-saving best. That's the way it is with the most widely used engine in the business—Chevy's Thriftmaster 6!

Rarely does any truck engine—even a Chevy Thriftmaster 6—run up a performance record like this one. We point it out here merely as proof that the Thriftmaster 6 brings *staying power* to spare to any job it tackles. It's evidence that Chevrolet puts real truck "horses" under the hood—in a light-duty power plant that's built to outlast and outsave any other you can name.



Hustling air mail from airports to town on a stop-watch schedule is a 24 hours a day, 7 days a week responsibility Earl McDaniel, U.S. Mail Contractor, shares with his '59 Chevy ½-ton panel. And, according to Mr. McDaniel, after 230,000 miles, the truck "still purrs like a kitten . . . hasn't had or needed an engine overhaul. The pan has never been off, the valves have never needed grinding."

The Thriftmaster 6 provides the basic power for Chevy's conventional light-duty truck line. *Standard* in pickups, panels, light-duty stakes, delivery vans and the Suburban Carryall, it's the end product of many years of engineering refinement.

It provides economy-contoured camshaft and improved carburetion to give you extra power, extra miles from every gallon of gas. Also, there's a forged steel crankshaft, high quality steel and steel alloy valves, durable precision bearings, full pressure lubrication system, oil-bath air cleaner—all contributing to longer engine life and greater overall economy. This is the most experienced truck engine in the business, and it's ready to wade into your roughest work and keep you way ahead on fuel and maintenance expense. It'll pay you to check into it at your Chevrolet dealer's! . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

THRIFTMASTER 6 PERFORMANCE DATA

Gross Horsepower.....	135 @ 4000 rpm
Net Horsepower.....	115 @ 3600 rpm
Gross Torque, lb.-ft.....	217 @ 2000 rpm
Net Torque, lb.-ft.....	195 @ 2000 rpm
Piston Displacement.....	235.5 cubic inches
Bore and Stroke.....	3 ¹ / ₁₆ " x 3 ¹ / ₁₆ "
Compression Ratio.....	8.25 to 1

1961 CHEVROLET STURDI-BILT TRUCKS

CHEVROLET

... for more details circle 315 on enclosed return postal card
ROADS AND STREETS, July, 1961



Front paver discharging ahead of first of two Blaw-Knox spreaders. This simple 2-paver train made steady footages once the weather dried up.



Modified Johnson equipment unloaded 10 to 12 cars of bulk cement per day. A D6 tractor spotted cars.

GOOD 'UP-FRONT' CONTROL

Continued from page 116

spread of base as possible. This was done both to minimize job costs and, again, to secure uniformity. The accuracy of the final base preparation is attested by the fact that the contractor secured ——— percent of theoretical yield for the job.

The paving train was made up of two Koehring 34-E dual-drum pavers. Two Blaw-Knox spreaders (one for each lift), Heltzel finisher, mechanical belt, double burlap drag, hand finishing equipment, and curing spray applicator—plus Clipper saws for joints. This familiar combination was supported by Butler and Blaw-Knox equipment at the batch plant and by 28 Ford batch trucks with 2-compartment bodies.

Once the weather dried up after early July, 1960, the job got into stride and production averaged 2,800 ft. per day with the relatively simple two-paver train.

In charge for Cameron, Joyce & Co., Inc., were Jack B. Gammon, general superintendent and H. L. Wear, job superintendent. Russell Fiscus was resident engineer for the Iowa Highway Commission, and Dudley B. Chittenden, chief inspector.

Subbase Material for an Iowa 'T' Project

Typical gradation meeting Iowa specifications

Sieve	Percent Passing
1 1/2	100
1	98
3/4	94
3/8	90
4	83
8	76
30	52
40	42
100	16
200	11

Not more than 5% of the particles to be retained on a sieve having openings 1/4 the normal thickness (4 in. in this case) of the subbase. Not more than 25% passing the 200 sieve. Plasticity Index not greater than 6.

COST INFORMATION

Continued from page 53

months. Thus a comparison may quickly be made between the two Profit and Loss Statements.

In an actual financial analysis, the Balance Sheets for only three months, plus only two Profit and Loss Statements covering but a single year's operations, would be regarded as rather sketchy information. Suppose that an accountant or financial analyst is actually faced with this sort of a situation, with only a limited amount of information available. Then he must base much of his appraisal on what he knows to be realistic values, in the form of percentages and ratios for similar firms that are succeeding.

However, since this is a mythical roadbuilding concern whose records have obviously been "doctored," we shall go ahead and use these figures for demonstrating how a comparative analysis might be made.

Steps to Be Taken

The following list of the steps to be taken in a suggested numerical sequence shows such a typical approach for accomplishing this analysis.

1. Set up a base period.

With the information at hand, the first step consists of establishing what is referred to as a Base Period or starting point. This Base Period may be the first year of a company's operations. However, it is not unusual for an analysis to be prepared over a recent 3 to 5 year period—in which case, the Base Period will merely be the earliest interval.

In the case at hand, the base period for the Profit and Loss Statements will be the first six months of 1960. Similarly, for a review of the Balance Sheets, this will be October, 1960. It should also be noted that in an actual study, the same base period would be used for examining both Balance Sheets and the Profit and Loss Statements.

2. Develop a percentage analysis of the Profit and Loss Statements

Percentages—such as are indicated on the accompanying Profit and Loss Statement—are not al-

ways to be found on such Statements. However their use for simplifying these statements is certainly recommended. This is because they highlight the most important sources of Profit and Loss or Income and Expenditures.

Likewise, when two or more Profit and Loss Statements are combined, this ready reference to such simple percentages makes the following significant facts more apparent.

(a) The degree of change in composition of either earnings or expenses.

(b) The amount of change as a percentage of the Total Gross Income of any item or group of items.

(c) Emphasizing the significance of certain cost items which might otherwise be taken more or less for granted.

The application of these percentages to the items on a single Statement is known as a Vertical Percentage Analysis. When successive Statements are combined (and in addition the periodic changes are tabulated, as on this Combined Profit and Loss Statements), it becomes possible to read such changes in percent for any item over more than one period. Such an array of percentages is called a Horizontal Percentage Analysis.

The definition of these two terms is made because it is good practice to examine *both* Horizontal and Vertical Percentages.

3. Combine the Balance Sheets.

The Combined Balance Sheets used in this article illustrate a fairly simple way to perform this step. By means of a common set or list of summary entries (such as the ones shown), which cover all asset and all liability classifications, this listing merely requires transferring such information from the monthly worksheets to this compilation.

In connection with this operation of Combining the Balance Sheets, there are two items worth noting. First, the amount of change in any entry such as the one for "Cash on Hand, etc." is noted in terms of thousands of dollars, this is in order to simplify the reading and comprehension of such a change. Secondly, changes in the items themselves are expressed in dollars rather than percentages. This has been done because Balance Sheets are considered to be more concerned over dollar-wise

than percentage-wise changes.

4. Look for trends

This means to examine each group of items and then the individual items to see the way that they have been changing during the specified period of time.

You will recall that on all of these combined statements, separate provision was made for examining the periodic changes of any entry. While this treatment calls attention to fluctuations in each item, it has still another very important purpose. That is to indicate the tendencies of sources of expense to increase, normally minor expenses to suddenly grow, and sometimes of accessory operations (such as the "U. & I. Gravel Plant") to develop into significantly profitable operations.

Looking for Profit Trends

As such tendencies become better defined, they are termed trends. Good management of a roadbuilding company involves looking for such trends in order to take corrective action and thus continue with a profitable operation.

As a case in point, let us go through the present accounts of the "U. & I. Roadbuilders, Inc." and look for such trends. To begin, the Liability Balance Sheet has this to say:

1. Current Liabilities—No trends indicated. Expenditures in November increased the size of the account.

2. Fixed Liabilities—Possible tendency of the company to assume a succession of long-term obligations should be watched. This is especially critical because no reserves have been established to meet these notes when they become payable. Such pyramiding of bills is dangerous.

3. Surplus—This account which represents retained earnings shows a remarkable fluctuation. This fact implies that the company is probably operating with limited finances. This assumption is further confirmed by the higher-than-average amount of financial expenses shown on the latest Profit and Loss Statement.

Now referring to the Asset Balance Sheet, these observations are to be noted:

1. Cash on hand. No trend ten-

Continued on page 124

NOW! GAR WOOD OFFERS TO HELP YOU



Free-Flowing Materials Hauled Safely in Enclosed Hoppers

Bulk handling of cement, lime, chemicals, and other free-flowing materials can be hauled fast and inexpensively in Gar Wood enclosed hoppers—with no chance of damage or loss from spillage or contamination.

These hopper trailers let you load and unload in record time, haul bigger payloads over the highways, schedule more trips per year.

Enclosed Gar Wood hoppers are available as train or semi-trailer units, equipped with one, two, or three discharge gates.

GAR WOOD HOPPER TRAIN INCREASES HAULING CAPACITY

This big, rugged double hopper train carries a total of 20.5 cubic yards. Ideally suited for general contracting use with aggregate, sand, fill, and spoil materials. Air-powered clam-shell gates allow quick dumping at high speeds. Material can be pit-dumped, windrowed to specifications, or stockpiled.



TRAILERS CUSTOMIZED FROM STANDARD EQUIPMENT TO MEET EVERY RESTRICTION, EVERY APPLICATION

Though Gar Wood hopper trailers are available in a wide range of open and closed models for train and semi-trailer operation, with a complete line of discharge gates, they may also be customized to your exact road-weight restrictions, your exact application.

This design versatility allows you not only absolute maximum payloads, but faster, more efficient operation at minimum maintenance and operating costs. You get a unit specifically tailored to bring you the greatest pos-



sible revenue within your specific field of operation.



GAR WOOD "EASTERNER" hopper trailer gives you powerful tandem-drive traction plus far greater legal payloads. This unique combination produces extra hauling revenue for both on- and off-highway work.

New York Contractor Earns 45% More With "EASTERNER"

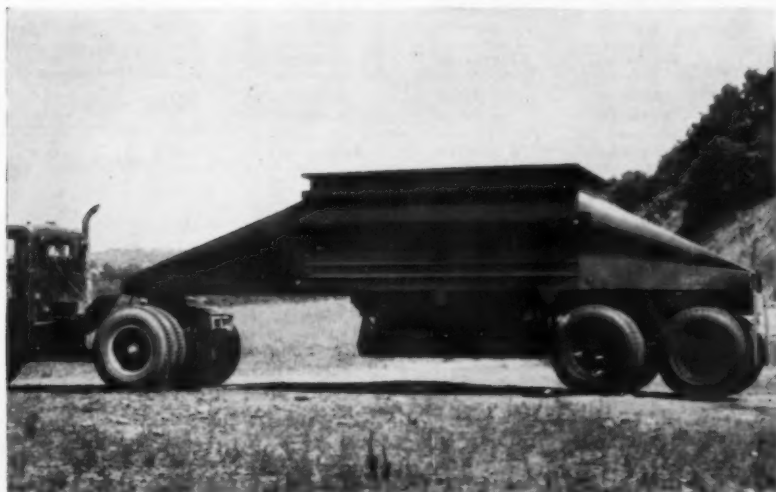
A recent on-the-job Payload Analysis in New York State compared the performance of a tandem rear dump truck and a Gar Wood "Easterner" hopper trailer, both owned by the same contractor. The job involved hauling gravel for road construction.

The figures shown were not drawn up in an office, they were compiled with the contractor in the field. The contractor is now replacing more of his rear dumps with Gar Wood "Easterners."

	HOPPER TRAILER	REAR DUMP TRUCK
Legal Yards Per Trip	15	10½
Yard-Miles Per Trip	105	73.5
Revenue Per Trip, Per Unit	\$13.20	\$9.11
Revenue Per Day	\$158.40	\$109.32
Working Days Per Year	120	
Extra Revenue Per Day	\$49.08	
EXTRA REVENUE PER YEAR, PER UNIT	\$5,889.60	

FREE PAYLOAD ANALYSIS HAUL MORE-EARN MORE!

*New Service Can Help You Greatly Increase
Your Hauling Income*



GAR WOOD MONO-SHELL HOPPER TRAILERS are sold and serviced by the nation's largest network of experienced truck equipment specialists. These Gar Wood distributors know your local hauling problems, understand your state axle-weight laws.

HOPPERS ELIMINATE FINES, RAISE PAYLOADS, LET YOU OPERATE LEGALLY AT A PROFIT

Whatever your regional requirements, Gar Wood hoppers let you haul legal payloads not obtainable with any other equipment, and eliminate profit-slashing overload fines. The reasons: exclusive Mono-Shell construction that cuts dead weight to a minimum, and exclusive mounting techniques that distribute more weight over a much greater axle span.

Gar Wood has employed these methods in designing hoppers for on- and off-highway work, in hoppers for hauling all types of materials, in hoppers specifically tailored to axle-weight laws in every state in the country.

Start taking advantage of this opportunity to increase your profits now. Let Gar Wood show you how

hoppers will give you a legal operation that is faster, more efficient, more productive—an operation that will let you make much more money.

WAYNE, MICHIGAN—Gar Wood Industries, world's pioneer truck equipment firm, announces an exclusive new service that determines, in dollars and cents, the amount of additional income you can earn with Gar Wood Mono-Shell hopper trailers, *and then helps you earn it!*

Gar Wood engineers first make a Free Payload Analysis of your operation. They calculate the hauling revenue for each of your present units by yard-mile, day, and year, and compare the data with the established nine-year performance record of Gar Wood hoppers. And then, regardless of your hauling job, Gar Wood will *show* you how to use hoppers to earn that extra income.

The results are often amazing. To date, Gar Wood has been able to offer haulers as much as **45% extra revenue per year** (see story opposite page) plus significant increases in operating efficiency.

Think what 45% more revenue, practically all pure profit, could mean on your own job. Then mail the coupon below.

SEND FOR YOUR FREE PAYLOAD ANALYSIS TODAY

Name _____

Address _____

City _____ State _____

☐ SEND FREE LITERATURE

☐ SEND FREE PAYLOAD ANALYSIS FOR THE FOLLOWING:

Type of material hauled _____

Present type of equipment _____

Tare weight of present equipment _____

Tons hauled per trip _____

Miles per trip (one way) _____



Send coupon to:
**GAR WOOD
INDUSTRIES, INC.**
Customer Service Dept.
Wayne, Michigan

... for more details circle 314 on enclosed return postal card

ROADS AND STREETS, July, 1961

Balance Sheet October, November, December, 1960

	Liabilities			Change Oct.-Nov. in \$1,000	Change Nov.-Dec. in \$1,000
	October	November	December		
Current:					
Notes Payable	\$ 2,480.00	\$ 4,420.00	\$ 2,160.00	+ 1.9	- 2.3
A/C Payable	1,500.00	2,800.00	3,200.00	+ 1.3	+ 0.4
Due Subcontractors	6,500.00	12,500.00	9,500.00	+ 6.0	- 3.0
Equipment A/C	8,140.00	36,400.00	32,760.00	+28.3	- 3.6
Taxes, Payable	1,500.00	1,800.00	2,100.00	+ 0.3	+ 0.3
Other Payables	4,460.00	5,660.00	6,860.00	+ 1.2	+ 1.2
Total Current Liabilities	\$24,580.00	\$63,580.00	\$56,580.00	+39.0	- 7.0
Fixed Liabilities:					
Note Due June 1, 1961	\$ 5,000.00	\$	\$		
Note Due Jan. 2, 1961		10,000.00	10,000.00		
Total Liabilities	\$29,580.00	\$73,580.00	\$66,580.00	+44.0	- 7.0
Capital:					
Capital Stock	\$46,000.00	\$46,000.00	\$46,000.00		
Surplus	19,420.00	5,120.00	37,420.00	-14.0	+32.0
Total Liab. plus Capital	\$95,000.00	\$125,000.00	\$150,000.00	+30.0	+25.0
Current Assets	52,780.00	65,760.00	83,700.00	+13.0	+18.0
Less—Current Liabilities	24,580.00	63,580.00	56,580.00		
Working Capital	\$28,200.00	\$ 2,240.00	\$27,120.00	-26.0	+25.0

COST INFORMATION

Continued from page 121

dencies seen, however the range of Cash on Hand indicates that a minimum cash reserve of around \$5,500.00 may be necessary in order to cover current operating expenses. The somewhat eccentric actions of this item, Surplus and Fixed Liabilities together with the Financial Expenses, would suggest that a further study be made of the Roadbuilders' method of financing.

2. Receivables.

(a) Progress Payments—The size of these will, of course vary according to the work in progress. It is a healthy sign when a constant or steadily increasing volume of such income can be maintained. Sometimes it is possible to compensate for variations in this source of income by means of sidelines such as the "U. & I. Equipment Rental" and the "U. & I. Gravel Plant" operations.

(b) "M. T. Acres"—Paving. A typical small paving operation. The fact that the work was worth \$4,500.00 in November, and did not appear in the December listings, although a \$4,500.00 Notes Receivable Item does, might indicate that the company had to take such a note to settle its claim.

(c) Rental Division—This is evidently an active sideline which is

showing a steady increase in volume. The trend is a good one. Investigation should be made to see if possibly this operation can be enlarged by sales promotion, and possibly by the purchase of more equipment which can either be rented or else used by the company. Profitability of this operation is confirmed by the latest P. and L. Statement.

(d) Gravel Plant—Another active sideline whose profitability is somewhat similar to the Rental Division's.

3. Total Accounts Receivable and Reserve for Bad Debts. The Accounts Receivable have shown a steady increase. However, the Reserve for Bad Debts infers that about one-tenth of those Accounts are dubious. Such a high ratio of Bad Debt Reserve to Accounts Receivable indicates either a few large bad accounts, slow collections or a very pessimistic attitude towards the customers. In any case, this situation should be cleared up.

4. Inventories. A steady growth trend is indicated which seems to roughly parallel the growth of the Rental Division.

5. Total Current Assets. This shows a steady growing trend and indicates an increase in operations.

6. Fixed Assets. Aside from a continuing increase, no certain

trend is indicated.

7. Tangible Net Worth and Total Assets. These two account items usually parallel each other in growth or decline. In this case a fairly steady rise in the company's Assets is noted which means that the company is exhibiting a strong growth trend.

8. Other Assets including Intangibles. Because they generally have very little value as a security, Intangibles are normally kept at a low appraisal. Any increase in their listed value should be made cautiously.

P & L Indications

By way of a final comparison, the Profit and Loss Statements have the following general indications. Trend predictions using only two P. & L. Statements would not be overly conclusive.

1. Income. Income from Contracts, while larger than before represented only 57% instead of 67% of the Company's Total Gross Income. This change in Contract Income means that apparently more of the company's Income is coming from Other Income. Such Diversification is normally a healthy sign, altho by no means should the original source of revenue be slighted.

Balance Sheet

October, November, December, 1960

Assets

	October	November	December	Change Oct.-Nov. in \$1,000	Change Nov.-Dec. in \$1,000
Current:					
Cash on hand and in banks..... \$	\$ 5,650.00	\$ 7,800.00	\$ 5,200.00	+ 2.2	- 2.6
Notes Receivable	2,800.00	2,400.00	4,500.00	- 0.4	+ 2.1
Less Notes Discounted	400.00	400.00	4,500.00		
Accounts Receivable					
Progress Payments	32,320.00	28,200.00	39,480.00	- 4.1	+11.3
M.T. Acres-Paving	2,150.00	4,500.00		+ 2.4	- 4.5
Rental Div.-Rentals	11,140.00	12,260.00	13,640.00	+ 1.1	+ 1.4
Gravel Plant-Sales		12,000.00	20,000.00	+12.0	+ 8.0
Total A/C Receivable	45,610.00	56,960.00	73,120.00	+11.4	+16.2
Less-Reserve for Bad Checks	5,610.00	7,960.00	7,210.00	+ 9.0	+16.9
Inventories	4,750.00	6,920.00	8,090.00	+ 2.2	+ 1.2
Total Current Assets	52,780.00	65,720.00	83,700.00	+12.9	+18.0
Fixed Assets:					
Acquisition Cost	68,970.00	88,780.00	100,970.00		
Less Depreciation	28,970.00	31,780.00	34,670.00	+17.0	+ 9.3
Tangible Net Worth	92,780.00	122,720.00	150,000.00	+29.9	+27.3
Other Assets Incl. Intangibles	2,220.00	2,280.00	3,000.00	+ 0.1	+ 0.7
Total Assets	\$95,000.00	\$125,000.00	\$153,000.00	+30.0	+28.0

2. Other Income. This item showed a definite gain in both dollar volume and its share of Total Gross Income which rose by a significant 10%.

3. General and Administrative Expenses. The fact that the dollar volume of this and the other expenses increased relatively slightly would infer that a large amount

of the company's expenses are relatively constant. Therefore, an increase in the volume of business beyond a "Bottom Amount" of
Continued on page 128



... for more details circle 335 on enclosed return postal card

***Sand would scrape
the markings off
most tapes!***

This is Lufkin's Super HiWay®. Engineers and layout men swear by it. The big reason: it has a Chrome Clad® line that defies defacement ... by sand, mud, grit or years of use.

Raised markings and protective borders are a part of the tape itself ... and will last as long. The line is .025" thick with a rust-resistant base coat and a series of electroplatings, topped by a final layer of tough chrome. It's the most durable tape line made.

Available in 100', 200' and 300' lengths, with or without reels. Three choices of end markings plus chainman's conversion rule.

Measure for measure, the finest made...

LUFKIN
SAGINAW, MICHIGAN

SAVE *1. The truck*



You can't find a better team for savings than this INTERNATIONAL model VF-190, with rugged V-8 power and Select-O-Matic

Put INTERNATIONAL Trucks with

Save on truck wear and maintenance: Why is a Select-O-Matic transmission best? A coordinated combination of a five-speed synchromesh transmission with solenoid-controlled hydraulic clutch and high-efficiency torque converter, it can make definite savings in clutch, axle and engine operation. The dry clutch problem is eliminated, because hydraulically-operated clutch is always either *positively engaged* or *disengaged* by the solenoid, preventing drag. Most important of all, the torque converter cushions shock-loads and minimizes danger of tearing out the rear-end or axle.

Save on drivers: More positive control of INTERNATIONAL Select-O-Matic 5-speed synchromesh transmission cuts down on drivers "lost-time" reports. High-efficiency torque converter and solenoid-operated hydraulic clutch means controlled up-shifting or down-shifting, less wheel

spinning. "Soft" starts become positive starts. Driving becomes less wearing, less "cowboy" and more nearly automatic. New drivers can be trained quickly and easily.

Save the schedule: Higher road speeds can be maintained with INTERNATIONAL Select-O-Matic transmissions. On grades, instead of the engine slowing down, the converter takes over to supply additional torque. Little speed is lost when shifting. Your drivers are given the pickup, the power and the gear selection to better *meet deadlines*.

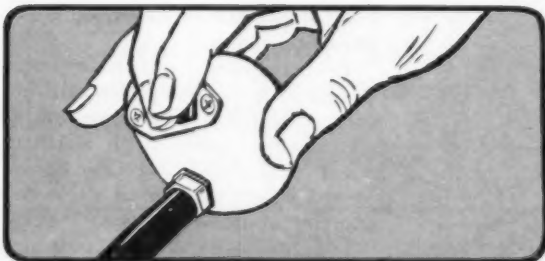
Everybody saves with proven INTERNATIONAL Select-O-Matic transmissions on their trucks—customers, owners, operators, drivers and maintenance men alike. Get the full story on performance-perfect Select-O-Matic transmissions from your INTERNATIONAL Truck Dealer or Branch. International Harvester Company, Chicago.

2.The driver 3.The schedule



transmission. This husky 33,000 lb. GVW rated 6-wheeler won't quit under any circumstances.

SELECT-O-MATIC *transmissions on your payroll*



Press this "Magic Button" for savings

Solenoid-controlled clutching is so convenient and so effortless, it has become the talk of the truck stops. With less work and less fatigue, drivers are able to give full concentration to driving. They are better able to select and maintain the gear to meet the terrain. Much of the time and labor is taken out of the job.

INTERNATIONAL® TRUCKS

WORLD'S MOST
COMPLETE LINE



... for more details circle 326 on enclosed return postal card

ROADS AND STREETS, July, 1961

U. & I. Roadbuilders, Inc. Profit and Loss Statement

January 1 to June 30, 1960

Item	Amounts	Percent
Income:		
Contracts Outstanding	\$1,862,501.00	
Less—Uncompleted Work	256,324.00	
Contract Revenue	\$1,606,177.00	
Less—Cost of Contract Work	1,522,927.00	
Income from Contracts	83,250.00	67.0
Other Income:		
Equipment Rentals—Profit	35,600.00	
Equipment Sales (Loss)	(6,600.00)	
Income from Gravel Plant	12,000.00	
Total Other Income	41,000.00	33.0
Total Gross Income	124,250.00	100.0
Expenses:		
General & Administrative	83,532.00	67.1
Financial Expenses	3,246.00	2.4
Cost of Getting Jobs (Bids)	18,625.00	15.3
Total Expenses	105,403.00	84.8
Operating Profit	18,847.00	15.2
Extraordinary Expenses	450.00	0.4
Net Profit Before Taxes	18,997.00	14.8
Federal, State and Local Taxes	9,057.00	7.3
Net Profit After Taxes	9,340.00	7.5

1. Apart from those general and administrative expenses which were pro-rated to the various Contracts and included in the heading of Cost of Contract Work.

U. & I. Roadbuilders, Inc. Profit & Loss Statement Six Months Period

July 1 to December 31, 1960

Item	Amounts	Percent ¹	Change From First Half 1960
Income:			
Contracts Outstanding	\$3,548,178.00		
Less—Uncompleted Work	1,905,121.00		
Contract Revenue	\$1,643,057.00		
Less—Cost of Contract Work	1,557,707.00		
Income from Contracts	\$ 85,350.00	57.0	—10.0
Other Income:			
Equipment Rentals—Profit	39,200.00		
Equipment Sales—Profit	500.00		
Income from Gravel Plant	18,000.00		
Sale of Plant Site	7,000.00		
Total Other Income	64,700.00	43.0	+10.0
Total Gross Income	150,050.00	100.0	
Expenses:			
General & Administrative	86,500.00	57.6	— 9.5
Financial Expenses	5,900.00	3.9	+ 1.5
Cost of Getting Jobs (Bids)	17,650.00	11.8	— 3.5
Total Expenses	110,050.00	73.3	—11.5
Operating Profit	40,000.00	26.7	+11.5
Extraordinary Expenses	3,500.00	2.4	+ 2.0
Net Profit Before Taxes	36,500.00	24.3	+ 9.5
Federal, State and Local Taxes	18,300.00	12.2	+ 4.9
Net Profit	\$ 18,200.00	12.1	+ 4.6

¹Expressed as percent of total gross income.

COST INFORMATION

Continued from page 125

around \$125,000.00 can represent as much as a Net Profit of 35% on the increased increment! For example, the Net Profit of \$124,250.00 was \$9,340.00; increasing the Gross Income by an additional \$25,800.00 was accompanied by an \$8,860.00 increase in Net Profit.

While this is admittedly an unusual case, it does help to prove that one of the bugaboos facing many roadbuilders has been the constant need to get a larger volume of business in order to justify their relatively high fixed expenses.

4. Financial and Extraordinary Expenses. These always represent a definite bite into the Profits. If however, they were necessary in order to do a larger volume of business then they are somewhat warranted. But, they always bear watching.

5. Cost of Getting Jobs. This is a fluctuating expense. It can be tied to the value of new contract work. In this particular company it seems to represent about 1% of that figure.

6. Operating Profit. Here is a measure of a company's efficiency. It was noted earlier that a relatively small increase in the Gross Income was followed by a large gain in Net Profit. The increase at this point is, of course, due to this fact.

7. Net Profit After Taxes. Taxes were assumed to consume approximately half of the Total Net Profit. The remainder of 12% of the Total Gross Income is however, an unusually large percentage return. Furthermore, it represents about 40% of the value of the Company's Capital Stock! BUT, in such a case, a reserve should have been set up to cover the Fixed Liabilities as well as provide some dividend to the stockholders.

In conclusion, you have been presented with a four-step outline of a typical method for making a comparative analysis of Balance Sheets and Profit and Loss Statements, which may be of value in studying your own costs.

It is to be hoped that possibly some parts of the analysis of the financial affairs of that "dummy" firm of "U. & I. Roadbuilders, Inc." may be of value to readers of **ROADS AND STREETS**.



SAVES MONEY, SAVES FUEL, SPEEDS WORK: 80 lb. tool hits top wallop with 34 hp compressor engine running less than 1750 rpm.

Best small compressor buy on the market

JAEGER 75

**costs much less to own and
operate than an "85" . . .
and is a better size to run an
80 lb. breaker.**

(Maintains full 90 psig at the tool)

A HEAVY PAVEMENT BREAKER USES LESS THAN 75 CFM OF AIR:
Actually, 72 cfm is all you need to operate an 80 lb. tool
at full speed and wallop, maintaining 90 psig at the tool.

Contractors, utilities and public works departments that
want the most efficient compressor for one-breaker work
are using the Jaeger "75" Rotary. It is most economical to
buy and operate and is the best size for the purpose. Also
runs 3 backfill tampers or 2 clay spades at their top efficiency.

Jaeger also builds an "85" for work that requires it.
Both models are fully equipped with automatic blow-down
valve, tool boxes big enough for a full set of tools and
spring-mounted, easy-handling trucks. Ask your Jaeger distributor
for prices and specifications, and compare.

THE JAEGER MACHINE COMPANY

Columbus 16, Ohio

Jaeger Machine Co. of Canada, Ltd., St. Thomas, Ontario

*Worldwide sales and service through Jaeger International Corp.,
Apartado 137, Panama, R. P.*

... for more details circle 330 on enclosed return postal card

129



**85 — Single Stage
125 — Two Stage**

**250 — 2 or 4 Wheels
365 — GM 4-71 Diesel**

**600 — GM 6-71 Diesel
900 — GM 6-110 Diesel**

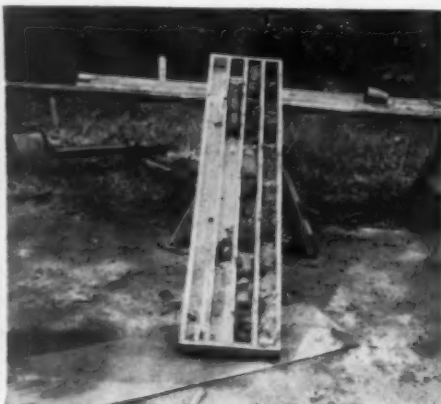
ROADS AND STREETS, July, 1961



Vane Shear Device running "in place" shear test for embankment foundation stability.



Core drill equipped with soil sampler.



(Left): Core samples obtained by drive sampling. (Right): Samples in core box for correlation and analysis.



(Left): Disturbed soil sampling equipment, hand method. (Right): Undisturbed sampling equipment, hand method.

PROJECT QUALITY CONTROL

Continued from page 84

for necessary checks during work progress. There is no effective substitute for skilled inspection and workmanship during the time that paving and finishing operations are under way. To correct poor finishing, in order to meet allowed tolerances after the work is too far along, generally produces substandard results.

Quality control can only be obtained by quality inspection in sufficient quantity. The old adage that an inspector should wear out the knees of his pants and not the seat is still true. It is the surface of highways and bridges that the public sees and rides on. Every effort should be made to finish these in such a manner as to present a pleasing appearance and riding qualities.

There are some sound general guides which can be used in setting the project procedures for the earthwork segment of a project.

Specifications covering density requirements should be realistic.

Requirements should never be specified which are impossible to achieve within the characteristics of the material and the weather conditions, or in excess of the requirements of design. Such requirements cause deviation from the specifications and make it impossible for the inspector to do his job well.

It is suggested that ease of operation can be achieved by calling earthwork bids on a single classification basis. This can be modified by calling for bids between definite station limits where clear cut changes in classification occur.

It is, of course, obvious that clear delineation should be made between the various types of excavation entering into the work such as embankment foundation excavation, trench excavation, structural excavation, and drainage excavation. Specifically noting the types of excavation on the plans will serve to eliminate questions of type of classification at the completion of the work.

Grading Quantity Checks

Effective checks and double checks on methods for estimating the grading quantities should include the following:

1. Initiate procedures for comparing constructed quantities against preliminary.
2. Have sufficient soil characteristics tests, made prior to construction, to develop realistic shrinkage or swell factors. By so doing, it will insure that the balance of the finished job will be similar to the job contemplated at the time of contracting.
3. Require a written explanation from the project engineer for significant variances in the final estimate quantities from the planned quantities.
4. Require earthwork computations at the project level, at the district level, and spot check at headquarters level before payment of final estimate.

In view of today's high-speed construction of earthwork, it is necessary that density checks of embankments be taken regularly, and their results become known expeditiously in order to insure that specified density is being obtained. They should be made in such a manner so as not to delay the contractor's work. Field tests should be conducted by personnel properly trained. There should be provision made for confirming checks made at intervals by inspectors from district or headquarters level. In order not to hold up the contractor's operation, the formal testing program must be supplemented by con-

tinued use of visual examination and possible proof-rolling.

The inspector on an earthwork project must carefully control the depth of the lifts in which material is placed, the moisture content, and the application of the compactive effort.

The inspector on earthwork should keep a diary of the day's activities and a full record of his density checks and the results.

Inspecting Strength Factors

Since embankment failures are a major highway disaster, it is essential that the design should contain a factor of safety; and quality inspection should be practiced to insure that the design strengths of materials are achieved.

Adequate sub-drainage systems are increasingly important, as we are forced to marginal or somewhat unstable areas for highway locations. There are many solutions to embankment foundation problems. They are subject to change from that shown on the plans as the work progresses and the need becomes evident from the conditions encountered. After the treatment has been decided upon by the project engineer, an inspector must be present during placement of the material to ascertain the amounts used and that the installation is correctly positioned. He shall also record in his notes the true final location of any sub-drainage system.

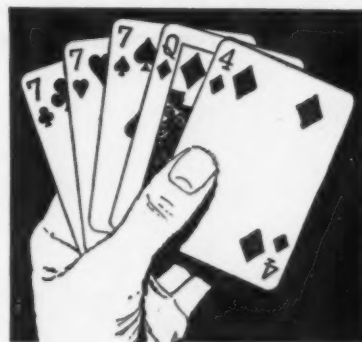
Also, the project engineer have enough progress photographs taken, since the work is not visible after completion.

Satisfactory flexible surfacings requires that control should start at the bottom. After it has been determined that a satisfactory subgrade, true to line, grade, and width is available, the construction of surfacing may be started in specified lifts. If the subgrade is irregular either in grade or cross-sections, the same characteristics will, to some degree, be transferred to the finished pavement. During placement of the base materials to the specified layer thickness, checks must be made to see that proper compactive effort is being applied.

Appropriate density tests should be required to be taken by competent project personnel. Any defi-

Continued on page 160

POKER? Play to win!



How would you play this hand?

Raise? If your 3-of-kind are nines or lower, yes. Four times in five your hand will be high before the draw, but protect it. If the 3-of-kind are tens or better, don't raise until after the draw. You want customers.

Here's a sure winner from FORD:

Sherman C-8 Bobcat power digger —master of the bell hole.

From one quick-set tractor position, the Bobcat digs clean, straight-sided bell holes faster and cheaper than any other unit on the market. Close-coupled to tractor, excellent for work in close quarters.

The Bobcat's a master of the small hole, too. Digs 5 feet deep with a surface opening as small as 48" in length. Get all the details from your Ford Tractor Dealer, or write:

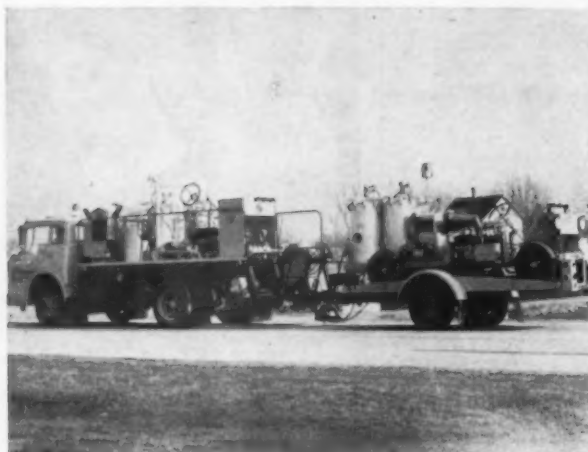
**Tractor and Implement Division
Ford Motor Company
Birmingham, Michigan**



... for more details circle 309 on enclosed return postal card

NEW PRODUCTS

Listed here are reviews of new and improved equipment items, selected to aid our readers in purchasing. See reader service numbers on enclosed postcard.*



M-B Caravan
Touring the
U.S.A.

Line-Marking Methods

The latest line-marking methods and striping equipment for streets and highways are currently being demonstrated through-out the U.S. by a mobile Linestriping Caravan sponsored by the M-B Corp.

The Caravan is composed of a heavy-duty truck-mounted striper equipped with a front or rear mounted carriage for centerline striping and a right hand mounted outrigger assembly specifically designed for edge-lining, the 120-gal. paint capacity self-propelled Master 10 Model, the medium-size self-propelled Linemaster with automotive-type steering and several other modern units. Featured is the specially designed M-B mechanical and electrical timing device for use in accurate striping of intermittent lines of predetermined cycles, and M-B rotary-type bead dispensers for use in accurately applying reflective beads.

M-B Corp., New Holstein, Wis.

For more details circle 101 on
Enclosed Return Postal Card.

Plastic-Lined Cooler

Four new plastic-lined models added to an extensive line of coolers has been announced by Igloo Corp. The new models are available in 2, 3, 5 and 10 gal. sizes and are for either hot or cold liquids.

The time-tested galvanized steel, corrugated outer wall has been retained

for the new colors; however, urethane foam has been applied as insulation inside the wall of these models. This forms an efficient, light-weight insulation.

A new seamless plastic liner to hold the liquid is then inserted into the cooler. This high-density polyethylene liner offers better sanitation, complete freedom from taste and odors, high temperature resistance and is completely replaceable.

The recessed spigot is used on these models. However, on the new plastic-lined cooler it is made of moulded plastic. A Keeper-Kord secures the lid to the carrying handles.

Igloo Corp., P. O. Box 7185, Memphis 18, Tenn.

For more details circle 102 on
Enclosed Return Postal Card.

New Backhoe

A new Warner & Swasey hydraulic backhoe built for use with Caterpillar



Warner & Swasey Backhoe

models 922, 944 and 966 wheel-type loaders has been announced by the Warner & Swasey Co.

The backhoe is fully hydraulic and can be snapped on or off in less than a minute without tools, according to an announcement by the manufacturer. Other important features include 180 deg. continuous swing and a 180 deg. bucket tilt. The unit has a 12 ft. 4 in. digging depth, 10,000 lb. breakaway at bucket teeth, and 15½ ft. reach from center of rotation. Outriggers are individually controlled and a turret type operator's seat is offered. Exclusive quick-change buckets are used. To be known as the Model 110 hydraulic backhoe, it is designed for use with Caterpillar-built machines and is being offered through Cat dealers only.

Warner & Swasey, Hill & Knowlton, 323 Republic Bldg., Cleveland 15, Ohio.

For more details circle 103 on
Enclosed Return Postal Card.

Wood or Steel Barricades

Two rugged new Dietz barricades, No. 360 and 361, are almost identical, but one features 18 gauge steel panels, the other is of ¾ in. plywood.

Panels on the new pieces are 12 by 42 in. and bolt tightly to the angle steel legs, using cap screws and hex



Dietz Traffic Barricades

nuts. Designed for use with Dietz Visi-Flash hazard warning lights, the barricades are finished in Federal Yellow, with alternating 6 in. wide yellow and black striping. The unit stands above ordinary car headlights.

R.E. Dietz Co., 225 Wilkinson St., Syracuse 1, N.Y.

For more details circle 104 on
Enclosed Return Postal Card.

*To readers outside of the United States—postal rules forbid use of business reply cards outside of the U.S. Please write to us listing the numbers, month and name of magazine, and mail with your name and address to Inquiry Dept., Roads and Streets, 22 W. Maple St., Chicago 10, Ill., U.S.A.

How to stretch tax dollars . . .



PETTIBONE WOOD PULVERIZER

Crushes in-place rock or asphaltic materials for low cost re-use

You can stretch tax dollars farther and complete jobs quicker with the PETTIBONE WOOD PULVERIZER . . . the only machine that scarifies and pulverizes old pavements, hard soils or rock in one operation!

The MODEL P-650 PULVERIZER takes up to a 6 to 8 inch cut compacted depth 6 feet wide per pass . . . and processes up to 1200 tons per hour. 12 inch maximum material crushed to 1½ inch minus.

In soil blending, the P-650 takes up to a 12 to 16 inch cut and prepares up to 1500 to 2000 cu. yds. per hour in blending with water to obtain high density.

Other features include: Self-contained Diesel engine for pulverizing (towed by a crawler tractor); low oper-

ating cost . . . tractor and pulverizer operator handle work normally requiring more equipment and manpower; accurate depth control with hydraulic jack; adjustable breaker bar and grids; adequate pulverization . . . material retained in pulverizer drum for a longer period for better breakage of the aggregate.

Pettibone Wood stabilization equipment is used for highway, airport and parking lot construction the world over. Write today for free job studies and your copy of "The A B C's of Soil-Cement Stabilization", an informative, 36 page booklet on stabilization techniques.

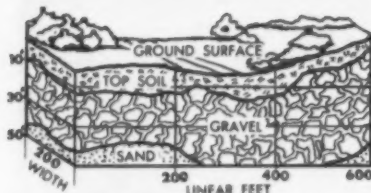


PETTIBONE WOOD MFG. CO.

P. O. BOX 620, NORTH HOLLYWOOD, CALIFORNIA

Originators of mix-in-place roadbuilding equipment

... determine SUB-SOIL LAYERS



Model 274M
"Michimho"

ELECTRO-GROUND

Shows

Type of Material, Location and Quantity

Complete determinations of sub-soil layers are made with this 20-pound instrument. Drive the short test rods into surface earth and employing the internationally accepted "Barnes Layer" method... location and composition of layers 100-ft. or more below the surface can be accurately plotted.

- Cuts Costs
- Saves Time
- More Accurate Bids
- No Drilling
- No Dynamiting
- One-Man Instrument Operation

Whether locating gravel deposits, seeking data on bedrock in cut areas, or determining sub-soil stability for construction plans... the Model 274M ELECTRO-GROUND will quickly provide dependable data. Write for complete information.

**LOW
PRICE...only \$575⁰⁰**

Saves its cost on one job!

Write for

New Manual E-63
containing complete
operating data

1-35.5

ASSOCIATED RESEARCH, Incorporated

3752 W. Belmont Avenue • Chicago 18, Illinois

... for more details circle 295 on enclosed return postal card

Light-Weight Crane Excavator

The first production model of the Koehring 155 Airborne crane-excavator has been shipped, Koehring announced recently.

This machine is the model 155, a 7-ton capacity, self-propelled unit designed for use in air transport, capable of being dropped by parachute. It has an extremely low profile, 81 in. from



Koehring's Light-Weight Crane

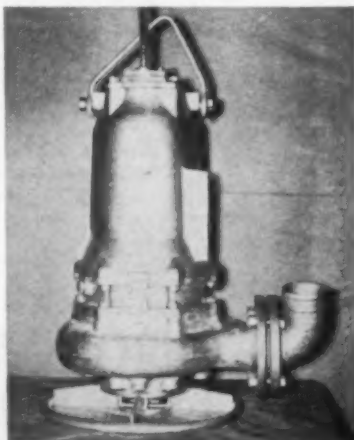
the ground to the top of the cab. No counter weights are needed or included. Weighing less than 16,000 lb., it will lift 14,000 lb. with a 24 ft. boom at a 10 ft. radius. Main machinery housing is fabricated aluminum, a weight saving idea. The machines presently being built are for a U.S. Army contract.

Koehring Div., 3026 W. Concordia Ave., Milwaukee 16, Wis.

For more details circle 105 on
Enclosed Return Postal Card.

Submersible Trash & Sewage Pump

The new 220/440 volt, three-phase Flygt CS-100 electric submersible trash



Flygt CS-100

and sewage pump is now available through Stanco Mfg. & Sales, Inc.

Equipped with a 6 hp. motor and 4 in. dia. hose, the portable machine is ideal wherever viscous liquids, process sludges, slurries, sewage or muddy water must be pumped. Silt, clay and water containing solids up to 2 in. can be pumped without difficulty, reports Stanco.

Stanco Mfgs. & Sales, Inc., 1666 Ninth St., Santa Monica, Calif.

For more details circle 106 on
Enclosed Return Postal Card.

New Heavy Tractor Series

Combining a 15 percent horsepower increase with basic improvements to the power shift transmission to boost production capability, the new series D9G Caterpillar tractor incorporates some major improvements in power train and final drives and has a redesigned track roller.

The new tractor's higher horsepower, now reportedly 385 flywheel rating, results primarily from a system of con-



Cat's D9-New G Series

trolled turbocharging with aftercooling of intake air. Development of a slip clutch for the fan drive also helps increase usable horsepower by reducing the power absorbed in driving the engine fan. The twin dry type air cleaners are 13 in. dia. each. The new oil cooled steering clutches require no adjustment. Three new, hydraulically boosted cable controls are available for the D9G.

Caterpillar Tractor Co., Peoria, Ill.

For more details circle 107 on
Enclosed Return Postal Card.

Masonry Surface Primers

A new coating that is reported designed for attractive spray applications has been announced by the Western Mineral Products Co.

Known as Perltext Prep Coat, it primes, fills and textures. The material can be used on exteriors, interiors below grade and may be mixed with paint. It is available in medium or coarse textures; in 25 lb. bags.

Western Mineral Products Co., 4725 Olson Memorial Highway, Minneapolis 22, Minn.

For more details circle 108 on
Enclosed Return Postal Card.

ROADS & STREETS
22 West Maple Street
Chicago 10, Illinois

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Name _____ Title _____

Firm or Gov't. Dept. _____

Street _____

City _____ State _____ 7-61

NOT GOOD AFTER AUGUST 15, 1961

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Chicago 10, Illinois

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<i>Further Information on Advertised Products:</i>											276	277	278	279	280	281	282	283	284	285	286
287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308
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Name _____ Title _____

Firm or Gov't. Dept. _____

Street _____

City _____ State _____ 7-61

NOT GOOD AFTER AUGUST 15, 1961



BUSINESS REPLY CARD
First Class Permit No. 52, Chicago, Ill.

ROADS & STREETS
22 WEST MAPLE STREET
CHICAGO 10, ILLINOIS



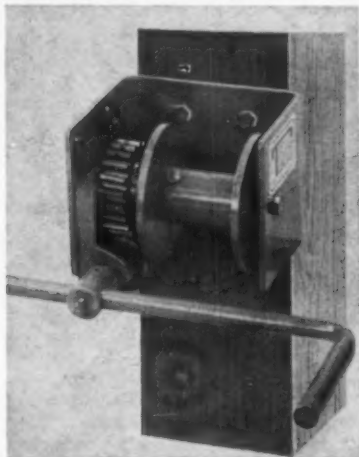
BUSINESS REPLY CARD
First Class Permit No. 52, Chicago, Ill.

ROADS & STREETS
22 WEST MAPLE STREET
CHICAGO 10, ILLINOIS

Worm Gear Winch

A new high strength, compact worm gear winch for holding, raising or lowering suspended loads up to one half ton in any position desired has been introduced by Thern Mfg. Co.

Featured in the Model 46605 is a machine cut gear made from heat-treated ductile iron. It reportedly has strength of 100,000 lb. per sq. in. The



Worm Gear Winch

drum is one-piece cast iron constructed and joined to the gear by a flange and slot method. The manufacturer states that the winch will hold up to 1000 lb. and will remain in position until the handle is moved. Supplied for either verticle or horizontal mounting it is recommended for applications where a suspended load must be quickly and easily raised or lowered.

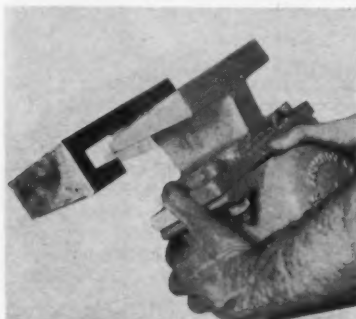
Thern Machine Co., Winona, Minn.

For more details circle 109 on Enclosed Return Postal Card.

Light Duty Electric Vibrator

A new portable light duty electric vibrator for moving material from bins, hoppers and trucks has been announced by the Cleveland Vibrator Co. Similar in mounting characteristics to railroad car vibrators, the RC-5 LSRR attaches with a cast iron wedge and bracket to permit dismounting.

The device can be removed from its brackets and moved anywhere a vibrator is necessary. The bracket is welded to the side of the bin or truck bed.



Cleveland's RC-5 LSRR

Using several brackets where the vibrator may be needed allows the operator to use the one machine in many different locations, when it is needed. The 40 lb. machine is reported to deliver 275 lb. and 3600 vibrations per min. Available in 110, 220, 440 or 550 volts, the vibrator operates on 60 cycle, single or three phase current.

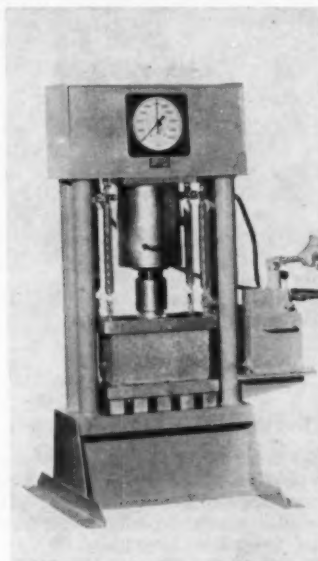
Cleveland Vibrator Co., 2828 Clinton Ave., Cleveland 13, Ohio

For more details circle 110 on Enclosed Return Postal Card.

Concrete Block Testing

A new concrete block testing machine of 400,000 lb. load capacity is now available from Soiltest, Inc. The machine is capable of testing concrete blocks in sizes up to 9 by 9 by 18 in. or standard 6 by 12 in. concrete test cylinders, the company reports.

The tester has been designed for quality control of prestressed concrete



Soiltest Block Tester

products, concrete blocks, ready-mix and other concrete products. Loads are developed by means of a hand operated, 2-speed concentric pump which actuates the main hydraulic loading cylinder. The pump develops the desired load rapidly in the initial phase and then shifts to a low speed, high pressure operation.

Soiltest, Inc., 4711 W. North Ave., Chicago 39, Ill.

For more details circle 111 on Enclosed Return Postal Card.

Cutting Torches

The availability of the Universal line of cutting torches that operate equally on either natural gas at city line pressures or on propane at cylinder pressures has been announced by the Harris Calorific Co.

Identified by product numbers 62-2F and 62-2AF, these torches are designed specifically for natural gas and

propane and to operate at any pressures from 3 oz. up. A range of tips are available to provide extra fast pre-heat



Harris Universal Torche

for scrap yards and demolition work. Also available are tips for precision cutting, gouging, rivet washing and heating.

Harris Calorific Co., 5501 Cass Ave., Cleveland 2, Ohio

For more details circle 112 on Enclosed Return Postal Card.

Hydraulic Fittings

A new Anchor O ring pipe thread fitting with N.P.T.F. female thread has been added to the Anchor line of weld-type hydraulic fittings for new flexibility in pipe tubing assemblies.

The new O ring fitting, available



Anchor O Ring Fitting

for pipe sizes from 1/2 in. to 3 in., will go on standard pipe and provide connection from pipe to SAE 4-bolt flange type connectors, eliminating thread-type connections.

Anchor Coupling Co., Inc., Dept. PR-11, 342 N. Fourth St., Libertyville, Ill.

For more details circle 113 on Enclosed Return Postal Card.

Safety Traffic Clothes

Available in vests, jackets, mitts and cross belts, Safety-Glo traffic clothes have alternate stripes of fluorescent "flame organe" for maximum daytime visibility and phosphorescent white to make the wearer actually glow in the dark.

Made of specially-processed cotton drill and vinyl fabric for long wear, the garments are fitted with elastic panels so that one model will fit nearly all sizes, reports the maker. The safety pieces are designed to be worn over clothing.

Eastern Metal of Elmira, Inc., 139 Grand Central Ave., Elmira Heights, N.Y.

For more details circle 114 on Enclosed Return Postal Card.

Utility Trencher

A new, heavy duty utility trencher with a verticle boom has been developed by Century Engineering Co.

The boom enters the ground at a vertical angle which enables the operator to work flush to walls, curbs and sidewalks. According to the manufacturer, the unit, known as the Century Trenchit, eliminates a trailer for



Century's Utility Trencher

transport. It quickly hitches to a car or pick-up by means of hydraulic controls and can be safely towed from job to job at highway speeds. For short distances the trencher can propel itself at a walking speed of up to 2 1/2 mph. All operating functions of the Trenchit are hydraulically controlled which is said to provide a smooth, simple to handle machine with safety. The machine will dig 4 to 12 in. wide with variable, selective depths.

Century Engineering Co., Waukesha, Wis.

For more details circle 115 on Enclosed Return Postal Card.

New Blasting Device

A new, compact blasting device said to be helpful in construction work and mining has been introduced by DynaMetric, Inc.

The device is also helpful in geophysical exploration. As shown here, the Model 117 is being used by an engineer to determine depths to bedrock. Bedrock depth determination up to 100 ft. or more can be made with the Timer using an instrumented sledge hammer to generate the seismic shock waves. The blaster, with seismic



Blasting Device Used with Seismic Timer

blasting caps, however, greatly extends the range of the seismic instrument for overburden and subsurface materials classification studies. The lightweight device, 4 by 7 in., is a battery operated, capacitor-discharge type, reported good for thousands of shots without a battery replacement. It has a built-in circuit tester, ready light and positive three-switch safety feature. The machine is available with a 2 capacity or a multi-cap capacity for larger shots.

DynaMetric Inc., 2955 E. Colorado Blvd., Pasadena, Calif.

For more details circle 116 on Enclosed Return Postal Card.

Citizen's Band Radio

A pocket size citizen's band radio weighing only 18 oz. and with a range of one mile under normal operating conditions has been introduced by Lafayette Radio Electronics Corp.

The unit is the Lafayette HE-29, crystal controlled with a super heterodyne receiver featuring push-to-talk operation. The HE-29 uses 8 batteries with a life of about 70 hr. It has a 46 in. telescoping antenna which transceive up to 7 miles under optimum conditions. The radio may be operated without FCC license or age requirements, states the maker. It may also be used as an integral part of any Class D radio system. It is expected to be useful in construction industries, fire and police departments.

Lafayette Radio Electronics, Jamaica 33, N. Y.

For more details circle 117 on Enclosed Return Postal Card.

Rolled Structural Shapes

The steel industry has announced the production of rolled structural shapes made from quenched and tempered alloy steels, according to a news release from U.S. Steel Corp.

Heat treated to design strengths as much as three times that of structural carbon steel, the new shapes are said to promise important weight and cost savings in a host of structural applications, according to U.S. Steel. Furnished in standard I-beams, channels and angles, and in lengths up to 40 ft., the new shapes are produced from several of the known quenched and tempered alloy compositions. Some of these are: USS "T-1" and "T-1" type A constructional alloy steels; 9 percent nickle steel for cryogenic applications at temperatures as low as -320 deg. F. and HY-80 naval armor steel.

U.S. Steel Corp., 525 William Penn Place, Pittsburgh 30, Pa.

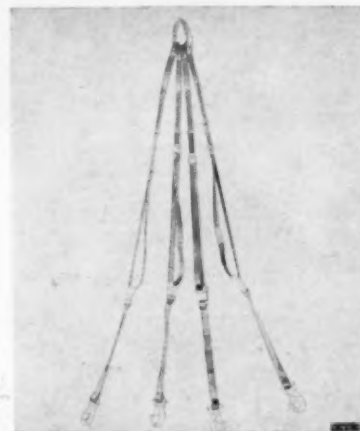
For more details circle 180 on Enclosed Return Postal Card.

Heavy Duty Sling

A new concept in slings for lifting heavy objects by crane or helicopter has been announced by the General

Logistics Div. of Aeroquip Corp.

The sling is made of heavy duty nylon webbing for strength and lightweight. Each of the four legs will support 10,000 lb. reports the maker. Each



Aeroquip Heavy Duty Sling

leg is adjustable and the lift ring can be disassembled with a screwdriver. The snap hooks on the end of each leg are also easily detachable without sewing.

General Logistics Div., Aeroquip Corp., 2929 Floyd St., Burbank, Calif.

For more details circle 118 on Enclosed Return Postal Card.

Mobile Blue-Print File

A new model file for drawings and prints has been announced by the Plan Hold Corp.

Known as the Mobile Plan Rack, it has a tubular steel frame and is equipped with ball bearing casters. This



Mobile Plan Rack

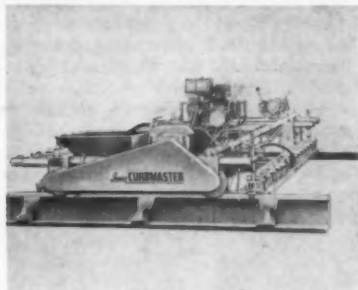
new device can be adjusted to accommodate sheets up to 36 by 48 in. It is intended for use with Plan Hold type "S" binders and provides filling for up to 1200 sheets. The holder weighs 18 lb. and covers 3 sq. ft. of floor space.

Plan Hold Corp., 5204 Chakameo St., South Gate, Calif.

For more details circle 119 on Enclosed Return Postal Card.

Electric Curbing Machine

The Iowa Curbmaster, model CMF, is all electric and powered by twin electric motors, one on either side of the machine and individually controlled. The big machine can back up by turning the directional switch to the reverse position. The generator, easily removed if necessary, is mounted right on the machine. Curb concrete is placed by means of variable speed vibrations and design can be changed



Iowa's Curbmaster

easily. A slab can be poured up to 21 ft. wide, while screeds can be set to any desired crown, reports Iowa Mfg. Co.

One feature of the new machine is that it can be converted into an integral curb builder for use on large paving jobs or converted into a curb and gutter machine. It is also reported ideal for widening present slabs. The maker suggests that by using this machine the smaller contractor can become a paving contractor on city jobs.

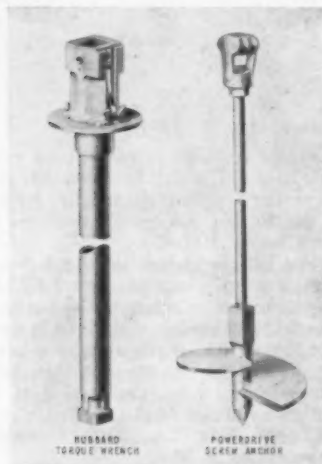
Iowa Construction Equipment Corp., Cedar Falls, Iowa

For more details circle 120 on Enclosed Return Postal Card.

Screw Anchors

A new type of screw anchor, installed with a power digger, is said to provide more positive holding power due to minimum earth disturbance during installation and increased helix diameters.

Known as PowerDriver, the manu-



Hubbard Wrench & Screw Anchor

facturer contends that eliminating usual installation variables—digging, expanding, backfilling and tamping—more consistently dependable and stronger anchoring is attainable. A simple wrench transmits the torque from the power digger directly to the hub of the anchor wing.

Hubbard & Co., Box 61, Lyons, Ill.

For more details circle 121 on Enclosed Return Postal Card.

Automatic Fan Drive

An automatic fan drive for heavy-duty International V-8 truck engines has been developed by the motor truck division of International Harvester Co. It will be available for heavy-duty International six-cylinder engines in the near future, it was announced.

The new drive is an electro-magnetic clutch located behind the fan. It is activated by a highly sensitive thermostat control located in the coolant stream. This control is pre-set to engage and disengage the clutch between desired engine operating temperature limits. Automatic engaging of the clutch when the coolant temperature reaches a maximum desired temperature results in normal fan operation. When the coolant temperature drops to normal, the fan automatically becomes free wheeling. This permits the engine to operate consistently in the most efficient coolant temperature range, thereby stabilizing operating temperatures.

International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.

For more details circle 122 on Enclosed Return Postal Card.

Larger Engine Trowels

Larger engines on 24 and 29 in. power trowels have been announced by the Muller Machinery Co. As standard equipment, 3 hp. engines will be furnished, on either 3 or 4 blade models.

This new machine has an improved



3 HP. Engine on 24 or 29 in Trowels

type of declutching mechanism, which makes engagement of the blades easier and gives the operator complete control over the blade operation. A new feature is the handle, which is longer and adjusts to the height desired by the operator. The stationary guard ring permits operation near walls and curbs.

Muller Machinery Co., Metuchen, N.J.

For more details circle 123 on Enclosed Return Postal Card.

400 Feet Daily



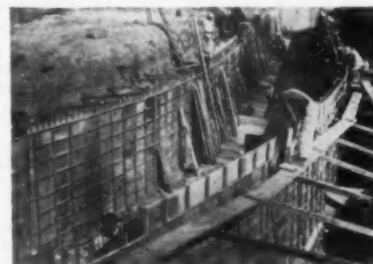
Extension Brackets and Symons Steel-Ply Forms

... enable contractor to pour at 15c a Square Foot

California contractor, Elmer J. Freethy saved substantially in pouring a channel lining for a flood control project at Pleasant Hill, California. It involved curved walls 9 ft high and 4,000 ft long.

Symons 8 ft Steel-Ply Forms were used with Symons New Extension Bracket, to get the additional foot. In addition to speed, the extension gave the final foot the appearance of a cap on the wall.

Wall specs called for a 1/2" extension joint every 40 lineal feet. The con-



Note extension brackets in foreground and minimum amount of bracing required for curved walls.

tractor had the 1/2" premoulded material cut 3" wider than the wall and used the wall forms to hold it in position. By using a 1" filler on these joints they were able to tie the forms together with long connecting bolts and pour the walls continuously.

Symons Steel-Ply Forms are rented with purchase option.

Symons

SYMONS CLAMP & MFG. CO.
4283 Diversey Ave., Dept. G-1, Chicago 39, Ill.
Warehouses Thruout the U.S.A.

MORE SAVINGS FROM SYMONS

... for more details circle 346 on enclosed return postal card

Vibration-Resistant Locking Resin

Three major construction equipment makers have announced that they are distributing "Loctite" locking compound through normal parts and accessory channels. The Loctite brand name appears on all containers along with the equipment brand names, such as Euclid, Caterpillar or International Harvester.

Acceptance of Loctite sealant as a useful maintenance tool to prevent vibration loosened parts has grown rapidly in the heavy equipment field. The thin liquid plastic converts into a tough part-locking bond when confined between metal parts. Its uses are: locks nuts on bolts so that no vibration can loosen them; repairs loose fitting bearings by retaining them in worn housings; seals joints in hydraulic systems and fuel line connections.

Recommendations by equipment makers for uses of Loctite include: locking track shoe bolts, locking track roller bracket bolts and cap screws, locking pivot ball cap screws and front transmission cap screws and hydraulic fittings.

American Sealants Co., Hartford 11, Conn.

For more details circle 124 on Enclosed Return Postal Card.

Three-Blade Rotary Mower

A new self-propelled, 3-blade rotary mower with 32 in. cut has been added to the Goodall line.

The machine features a deep welded steel housing, raised discharge chute and high suction life blades, which give it ability to handle heavy growth without choking or clumping, accord-



Goodall Rotary Mower ing to the manufacturer. The three blades, one 12 in. and the others 11 in. each, are belt driven. A separate blade clutch has automatic brakes which stop blades when the clutch is disengaged. The mower can convert to a walk-behind when it is being used on hill sides or difficult to reach places. The device can also be ridden with an optional lightweight sulky. On hillsides

the swiveling wheels can be locked in "straight ahead" position.

Goodall Mfg. Corp., Warrensburg, Mo.

For more details circle 125 on Enclosed Return Postal Card.

Portable Roller

The new Ellis "Hot Roll", model MP26, features both high-compaction of asphalt, plus easy portability. Designed for the paving of sidewalks and drives, this 26 in. wide roller is also suited for those contractors doing asphalt patching for cities and service companies.

The high temperature of this 600 propane fired roller produces two major results: compaction in excess of a 5-ton tandem roller plus a smooth



Ellis "Hot Roll"

voidless surface. Both reactions are due to a heat flowing of the asphalt and results are equal on either hot or cold mix. Model MP26 is powered by a 3½ hp. engine, forward and reversing at fingertip control, with handy clutch for easy stop and go. A standard 20 lb. propane tank fires the burner system for 16 hr. The "Hot Roll" hooks onto a truck tail gate in a special rack for easy hauling.

Ellis Distributing Co., Box 168, Liberty, Mo.

For more details circle 126 on Enclosed Return Postal Card.

MORE PROFIT ON EVERY JOB WITH TRUCO® JOB-MATCHED SAWS AND BLADES



COUNTER-BALANCED, SELF-PROPELLED CONCRETE SAW stays in cut and keeps cutting. Heavy duty 30 or 36 H.P. engine. 0'—36' per min. travel; takes 12", 14", 18" blades, cuts within 2" of curb or wall. Right or left hand cutting. Parking brake. Many other outstanding features of performance, easy handling, economy.



When front is raised, fifth wheel gives easy handling.

Send for new Truco catalog and price list.

ECONOMY SAW has rugged 18 H.P. gasoline engine or 7½ H.P. electric motor. Manually propelled.

TWO GREAT MASONRY SAWS—Truco Standard for high-speed, quality work at low cost. Takes 14" blades.

Truco Heavy-Duty, Super-Powered Saw—most powerful, most versatile saw; many features for easy, accurate use, economy, long life. 14" or 18" blade models.

TRUCO JOB-MATCHED ABRASIVE and DIAMOND BLADES for every make and model saw and every type of sawing in all materials. Unmatched for speed and economy and backed by the famous 50-year-old Truco name.



MASONRY DRILLING DIVISION
WHEEL TRUING TOOL COMPANY

2308-3200 W. Davison, Detroit 38, Mich.

573 Langlois, Windsor, Ont.

... for more details circle 349 on enclosed return postal card

Power-Pack Drill

A new convertible power-pack portable drill unit which has been designed to permit fast drilling of holes from 2 to 6¼ in. dia. has been introduced by the Clipper Mfg. Co.

The basic unit consists of the power pack, a 2 hp. continuous duty NEMA rated motor mounted on a portable tubular steel cradle, with flexible shaft and foot switch. A portable hand piece can be added to the flexible shaft. Holes up to 2 in. dia. can then be drilled with this Model DH-20.

Clipper Mfg. Co., 2800 Warwick, Kansas City 8, Mo.

For more details circle 127 on Enclosed Return Postal Card.

Fire Hazard Protection

A new chemical product designed to eliminate fire and slip hazards from oil and gasoline spills has been developed and is being marketed by The Penetone Co., Tenafly, N. J.

According to Penetone, the product, called Slix, is completely non-flammable, non-toxic, and odorless and is especially useful in breaking up oil slicks and removing flammable solvents from almost any surface. Slix shatters oil film into microscopic particles, chemically coats each droplet and surrounds it with water. When the oil is dispersed, it may be flushed into drains without endangering the walls of the sewer system, states the company.

Spills of gasoline, naphtha or turpentine will remain dispersed up to 24 hr. when treated with Slix. Oil spills, however, will remain fully controlled for approximately 3 hrs. depending on the size of the spill and the amount of Slix applied.

Allied Chemical's Nat'l Aniline Div., 40 Rector St., New York 6, N. Y.

For more details circle 128 on Enclosed Return Postal Card.

Jack-Leg Trencher

A new jack-leg Ditch Witch trencher is now available in 9 hp. and 12 hp. sizes mounted on rubber tires, the Witch Marketing Co. has announced.

The new machine has been developed primarily for use in the installation of underground street lighting cables or where it is desirable to trench the cable close to a curb or wall. The jack on the trencher wheel



Ditch Witch Jack Leg

may be installed on either side of the machine, allowing the spoil to be deposited on either side. The jack-leg is available in the 9 hp. Model M4-L or the 12 hp. Model M4-22L. The company reports that the leg will not effect the performance of the machine.

Witch Marketing Co., 1959 W. Fir Ave., Perry, Okla.

For more details circle 129 on Enclosed Return Postal Card.

New Dynamic Sieve Shaker

A new model field and laboratory sieve shaker has been introduced by Soiltest, Inc. The new shaker features a two dimensional shaking action which develops a circular motion plus 6 impacts per cycle to the test sieves.

Laboratory testing sieves are widely used in many industries for gradation studies and separations of materials by size. The new shaker's housing is



Soiltest Sieve Shaker

constructed of aluminum castings finished in epoxy resin to resist normal wear. Capacity is 8 in. dia. sieves plus a receiving pan and cover. The light weight of the new shaker permits easy portability. No permanent installation is required. The base of the shaker is 14 by 23 in. and the unit height is 35 in.

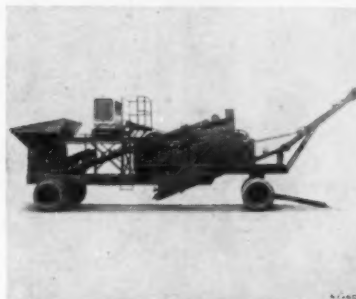
Soiltest, Inc., 4711 W. North Ave., Chicago 39, Ill.

For more details circle 130 on Enclosed Return Postal Card.

Portable Crusher

A compact, single-pass crushing plant designed for country and municipal road work and for contractor use on smaller projects has been announced by Pioneer Engineering Div. of Poor & Co.

The Pioneer No. 8 plant has a full 18 sq. ft. of scalping screen mounted ahead of the jaw and another 18 sq. ft. for volume sand removal and a 1066 size jaw crusher. The unit can be fed by power shovel, clamshell, dragline or from a ramp with a dozer. Baffles are provided in the screen



Pioneer Portable Crusher

hopper to allow fines to be removed or blended back into the pay product in any desired percentage. Because the plant was designed for ease of mobility, the company reports, it will meet all highway axle load limits and travel width requirements.

Pioneer Engineering, Div. of Poor & Co., Inc., 3200 Como Ave. S.E., Minneapolis 14, Minn.

For more details circle 131 on Enclosed Return Postal Card.

Street Patching Unit

A new unit consisting of a specially built dump truck which includes all the street maintenance equipment needed by the maintenance crew has been introduced by the Essick Mfg. Co.

Known as the Essick Patch Force, all the unit components are made by Essick. In addition to the two ton truck and dump body, the following equip-



Essick Patch Force Unit

ment is supplied as part of the complete unit: An Essick truck mounted combination 200 gal. emulsion sprayer; an air compressor of 45 or 58 cu. ft. capacity and an Essick EG 3000A 7 ft. combination air atomizer or straight pressure emulsion spray gun; one Essick 28 in. self-propelled vibrating roller and a one man surface heater.

Essick Mfg. Co., 1950 Santa Fe Ave., Los Angeles 21, Calif.

For more details circle 132 on Enclosed Return Postal Card.

Portable Compressor

A new type of portable compressor was announced recently by the Ingersoll-Rand Co.

Built to be the same size as the 900 Gyro-Flo and weighing 1000 lb. less, the new 1200 cfm is recommended for construction and mining fields. Employed is a new concept of compressing air, using cyclotidal rotors driven by a new GM 12V71 compact engine to provide light weight. The machine should solve space and weight problems and yet produce high capacity work, suggests Ingersoll-Rand. I-R now has a family of 7 portable compressors, ranging in size from 85 cu. ft. per min. to this newest addition, 1200 cfm.

Ingersoll-Rand Co., 11 Broadway, New York 4, N.Y.

For more details circle 133 on Enclosed Return Postal Card.

New Reciprocating Saws

A new metal cutting model which is reported capable of cutting all metals, including stainless steel has been introduced by Skil Corp. In addition to the new metal cutting saw, Skil offers a new improved version of their 2-speed, all-purpose Model 700. According to Skil, this combination of two reciprocating saws will cut virtually any material.

The new tool is the Skil Model 701



Skil's Metal Cutting Saw

Recipro Saw. It has two speeds, 1000 and 1400 strokes-per-minute, for cutting different gauges and densities of metal. The low speed is for stainless steel, other hard alloys, cast iron, any hard abrasive material. The high speed is recommended for cutting mild steel and non-ferrous metals.

Skil Corp., 5033 Elston Ave., Chicago 30, Ill.

For more details circle 134 on Enclosed Return Postal Card.

Lattice Frame Conveyors

A complete new line of Cedarapids strigid lattice frame conveyors have been announced by Iowa Mfg. Co. to meet the needs of industrial and aggregate producers with portable, stationary or semi-permanent installations.

A deep truss design, with heavy side bracing, increases conveyor strength without additional weight and provides high resistance to external stress. Hook bolts are used to fasten components such as motor mounts, hopper supports, A-frame connections, skirtboards and walkways so the conveyor frame, thus eliminating bolt holes which tend to weaken the main structure. Troughing rolls are clamp-mounted to speed assembly and facilitate belt training. Both troughing rolls and return rolls have Life-Seal ball bearings which are permanently sealed and lubricated at the factory. The conveyors are available in 18, to 36 in. widths and can be furnished in 2 ft. increments at any length desired. The head and tail sections are 6 ft. long and intermediate sections come in 8 to 12 ft. lengths.

Iowa Mfg. Co., Cedar Rapids, Iowa.

For more details circle 135 on Enclosed Return Postal Card.

Heavy-Duty Welding Torch

The availability of the new model 63-F heavy-duty, equal pressure oxy-acetylene welding torch was announced by the Harris Calorific Co.

The new torch features high-temperature silicone "O" ring seals that permit fast, easy change of tip assemblies. The torch's universal-type mixer accommodates the first 12 Harris tip



Harris 63-F Heavy-Duty Torch

sizes. Welding tip assemblies 15, 19 and 22 have individual mixers for maximum safety. Harris S-43-4 multiflame heating assembly also may be used with the new torch as well as a cutting attachment that cuts up to 6 in., reports Harris. The 63-F has a handle diameter of 1 1/4 in., a practical size for the heavy-gloved hand.

Harris Calorific Co., 5501 Cass Ave., Cleveland 2, Ohio.

For more details circle 136 on Enclosed Return Postal Card.

Portable Sandblaster

A new Handi-Blast portable sandblaster, Model 28A, has been introduced and is being marketed by the Handi-Blast Div. of Hamill Mfg. Co., Inc.

The manufacturer reports that the new machine will quickly clean dried cement, rust, dirt or paint, leaving a clean, dry etched surface. Constructed



Handi-Blast Sandblaster

of 1/4 in. steel, the device is completely portable, weighing only 24 lbs. Its dimensions are 29 in. high, 6 in. dia. tank. Each sandblaster is tested for 300 psi. and is said to effectively operate on the same air hook-up as any production spray gun. A squeeze grip abrasive delivery nozzle allows the operator to control and shut off the flow of abrasives at will. Pressures gauges and pressure relief valves are standard equipment, rendering safety in compliance with state and city regulations, where required.

Handi-Blast Div., Hamill Mfg. Co., Inc., Washington, Michigan

For more details circle 137 on Enclosed Return Postal Card.

Utility Blades

A new heavy duty utility blade, the Model AB-12 tractor mounted, is now being manufactured by the Arps Corp.

The new model weighs 428 lb. and is recommended for snow and earth moving. It offers a choice of 5 tilt and 4 pitch adjustments, 7 angular positions



Arps AD-12 Utility Blade

forward and 3 positions reverse. Close work is accomplished because of the 15 in. offset to left or right. The entire unit is reversed by lifting the lock pin and rotating the blade. The AD-12 is designed for interchange with 6 or 8 ft. landscaping or rock rakes.

Arps Corp., New Holstein, Wis.

For more details circle 138 on Enclosed Return Postal Card.

Low-Bed Gooseneck Trailers

An entirely new line of low bed, heavy duty, gooseneck trailers has been introduced by the Wisconsin Trailer Co.

The new models are reported available in 22, 27 and 30-ton capacities with a choice of straight deck, drop deck or beaver tail deck. Standard deck lengths are 23 ft., but longer lengths can be built to customer specifications, according to the company president. The new goosenecks have double plates at all critical wells, helping insure permanent strength and alignment. Oscillating walking beams are suspended independently. The 8 ft. deck, permits side or end loading.

Wisconsin Trailer Co., Richfield, Wis.

For more details circle 139 on Enclosed Return Postal Card.

Replacement for Roller Bridge Bearings

Maintenance of the rollers used in bridge expansion bearings has been remedied by replacement of these bearings with rubber expansion pads.

Bridge superintendents have found that by directly substituting rubber pads for faulty rollers, they have a simple and economical solution to expansion. This reduces maintenance to visual inspection and the painting of a small amount of extra steelwork which is easily accessible. Actually, the rubber pads are sandwiches of steel plates interleaved with rubber and having a minimum cover of 1/2 in. of rubber around the edges so there is little possibility of rusting. The pads often can be of the same depth as the rollers which they replace, greatly simplifying the job of substitution.

Advantages of substituting rubber for bearing expansion pads are described and illustrated in a current issue of "Rubber Development".

Natural Rubber Bureau, 1108 Sixteenth St., N.W., Washington 6, D.C.

For more details circle 140 on Enclosed Return Postal Card.

New Cooling System

A new cooling system, designed to eliminate a major cause of cooling failure in liquid cooled engines, has been introduced by the Wood Co.

The new system, known as the Wood liquid seal cooling system, eliminates aeration of the coolant. Air in the usual cooling system reduces effective-

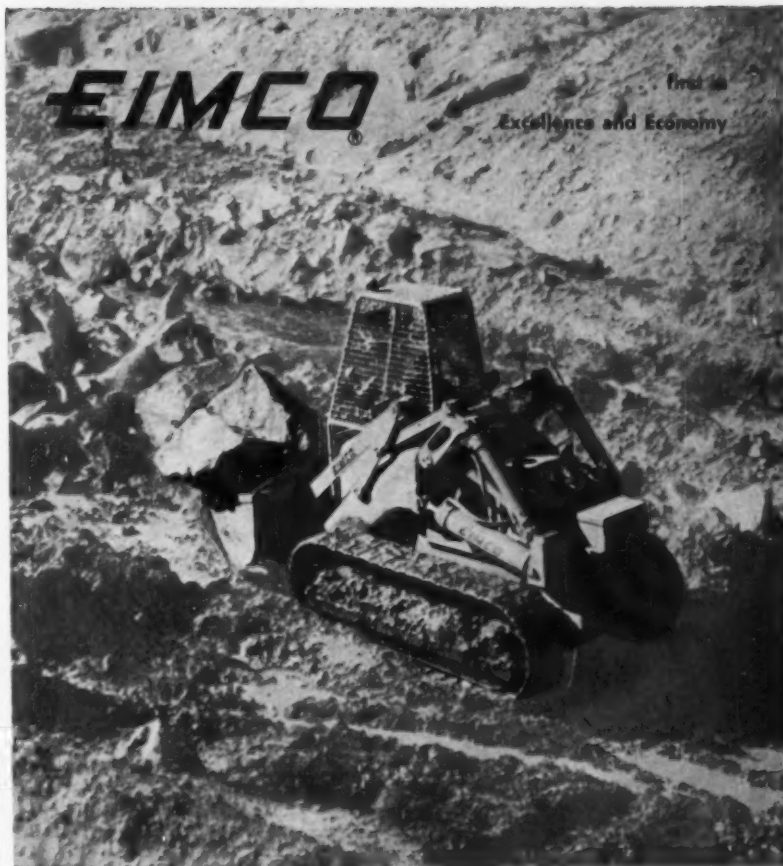


Wood's Cooling System

ness of the coolant, states the Wood Co. The Wood coolant is reported to maintain a constant coolant level in the radiator and trap the air in the system, thus eliminating the hot-spot problem. Installed in the top of the tank, it divides the radiator top tank into two separate sealed tanks. It is said to keep the core always covered with coolant to stop air circulation.

Wood Co., 1609 Wildwood Dr. N.E., Cedar Rapids, Iowa.

For more details circle 141 on Enclosed Return Postal Card.



The Eimco 126 Front End Loader pictured, with its 3 cu. yd. bucket, 45,000 lb. breakout force and carrying capacity of 33,000 lbs., affords maneuverability, flexibility and loading capacity unmatched by far higher priced types of loading equipment. Any Eimco loader gives you higher lift and longer reach than any comparable crawler-loader.

Each incorporates hundreds of improvements that mean even greater work-ability, productivity and longer life. The result is a heavy-duty, rugged machine that shows its rock-loading heritage in every component, capable of handling the toughest material year after year . . . even handles rock like dirt!

Many improvements are major. Some are minor. All add up to the best, most economical, versatile crawler units ever offered . . . even by EIMCO! Make us prove it! Check your nearby Eimco dealer or branch, or write The Eimco Corporation, P.O. Box 300, Salt Lake City 10, Utah, U.S.A.

The **EIMCO** Corporation

Head Office: Salt Lake City 10, Utah, U.S.A.
Export Office: 52 South St., N.Y.



"Advanced Engineering and
Quality Craftsmanship
Since 1884"

Twin-Shaft Vibrating Screen

A new vibrating screen reported to incorporate two shafts to provide screen pulsations, has been announced available by Koehring Co.

Known as the Ko-Cal "Twin-Shaft", the screen is available in three sizes: 4 by 8 ft., 4½ by 10 ft. and 5 by 14 ft. The name is taken from the double eccentric shaft construction instead of the normal single shaft. With the two-



Koehring's Twin-Shaft Vibrating Screen

shaft arrangement the company reports a more uniform pulsating action results over the entire length of the screen, helping to eliminate 'gallup'. Certain other features include bolts in stress points instead of welding, over-size drive belt to maintain timing of rotation and lighter weight.

Koehring Co. of California, 220 Country Club Blvd., Stockton, Calif.

For more details circle 142 on Enclosed Return Postal Card.

Portable Bridge Scaffold

A new lightweight aluminum scaffold that rolls on the bottom flange of exterior bridge beams has been announced by S&R Construction Specialties.

Designed to provide lightweight and portability, the new adjustable rolling platform is designed to erect and strip forms from overhang on bridges and for cement finishers to rub facias and parapet walls. The manufacturer reports that the new scaffolding can be disassembled quickly by two men and loaded in a pick-up truck for re-location. This is suggested to eliminate special crews and further permits quick stripping of forms. The device comes in two sections to facilitate working around pier caps. The only maintenance said to be necessary is periodic greasing of rollers.

S & R Construction Specialties, 360 Pattie Dr., Berea, Ohio

For more details circle 143 on Enclosed Return Postal Card.

Concrete Gun

Known as the Big Shot because of its production, a new concrete gun is being manufactured by the Air Placement Equip. Co.

According to the manufacturer, the Big Shot gets its production from a 15 in. spherical slide for faster cycling, a large 5 cu. ft. hopper and posi-

tive feed control. An automatic in-line fog oiler and new simplified valve action result in smooth operation. The large manhole-type access



The Big Shot

doors to upper and lower chambers cut clean-up time. Literature and further information is available from the maker.

Air Placement Equipment Co., 1000 W. 25th St., Kansas City 8, Mo.

For more details circle 144 on Enclosed Return Postal Card.

Pocket-Sized Transistor

A new pocket-sized, all transistor two-way radio has been introduced by the Raytheon Company's Distributor Products Div.

The small citizens band unit can transmit up to 2 miles over land and



Raytheon Pocket Radio

up to 5 miles over water, reports the manufacturer. It can receive signals from greater distances. Described as being no larger than two packs of cigarettes, the new unit will be useful to surveying teams, construction site workers and traffic or law agencies.

Raytheon Co., Lexington 73, Mass.

For more details circle 145 on Enclosed Return Postal Card.

Hydraulically-Operated Boom Crane

Several new hydraulically operated cranes with a fully hydraulic boom and positive control swing have been announced by the Grove Mfg. Co.

Ranging in capacity from 5 through 12 tons, the Grove units feature positive finger-tip control of all boom and hoist line operations. The cable hoist operates by hydraulic ram with single line under a maximum load. Standard parts are used throughout the machines



Grove RT-57 All Hydraulic Crane

eliminating replacement problems. Also standard on all units is power steering, with truck type steering wheel as an option.

Special attachments such as jib booms, rear mounted winches, car wheel tons and a 270 deg. swing for greater efficiency are available. Descriptive literature and distributor information is available from Engineering Equip. Co., 205 W. Wacker Dr., Chicago 6, Ill.

Grove Mfg. Co., Shady Grove, Penn.

For more details circle 146 on Enclosed Return Postal Card.

Improved CO₂ Welding

A new atmospherically heated flow-meter regulator for gas-shielded metal-arc welding using CO₂ gas has been marketed by Air Reduction. This new regulator is said to eliminate the problem of freeze-up in flow control equipment and the need for cumbersome supplementary heat sources.

The Airco two-stage carbon dioxide heated flowmeter regulator is equipped with an atmospheric heat pick-up element to handle nearly all carbon dioxide shielding gas requirements in arc welding. The regulator will perform satisfactorily in most applications where the flow and duty cycles do not exceed 80 ft. per hr. However, where the duty cycle is very high, a larger heat pick-up element is used. The unit consists of a chrome plated pre-set single stage regulator, a heat exchange coil, a second stage of pressure reduction and a float type variable area pressure compensated flowmeter that indicates the flow in standard cu. ft. per hr.

Air Reduction Co., Inc., 150 E. 42nd St., New York 17, N. Y.

For more details circle 147 on Enclosed Return Postal Card.

Engine Driven Pumps

Portable engine-driven centrifugal pumps in 1½ in. and 2 in. sizes have been added to the Rapidayton line of the Tait Mfg. Co.

Known as the Rapidayton Nomad, these self-priming pumps are made of a special aluminum alloy which combines light weight with strength and abrasion resistance. A hand grip makes unit easy to carry. The weight is 42-44 lbs. Powered by a 4-cycle air-cooled Briggs and Stratton engine with recoil starter, it is equipped with a 2 h.p. motor in the 1½ in. size and with a 3 h.p. motor in the 2 in. Total head for both models exceeds 90 ft. with capacities ranging beyond 5000 g.p.h. for the 1½ in. size and beyond 7200 g.p.h. for the 2 in.

Tait Mfg. Co., 500 Webster St., Dayton, Ohio

For more details circle 148 on
Enclosed Return Postal Card.

Portable Core Drill

The production of a new, portable core drill has been announced by the Acker Drill Co.

Known as the Acker Ambassador, the new drill features a heavy duty, high torque 2 speed reversible electric motor. Using thin wall diamond bits, the Acker Ambassador will core neat, clean holes through concrete and reinforced masonry. Because of its portability it should find good application in highway and municipal departments coring holes for parking meters and signs as well as test laboratory work. Other models are available powered with gasoline engines or air motors. The unit features full 360 deg. operation, rack and pinion feed, alloy gear unit, rugged base and sturdy steel construction throughout.

Acker Drill Co., Inc., P. O. Box 830, Scranton 2, Pa.

For more details circle 149 on
Enclosed Return Postal Card.

Wear Points

New "Shark Fin" wear points that provide maximum wear with minimum maintenance costs have been developed by the Hensley Equip. Co., Inc.

The firm reports that the new points offer complete coverage for shovels, draglines, backhoes and rippers or trenchers. Heat-treated by the latest methods available, the "Shark Fin" points are Brinnell-tested for controlled hardness and uniformity. Self-sharpening and quick changing, the points are designed to decrease digging resistance, keep points sharp and protect shanks. They are cast from a new abrasive resistant alloy steel for longer wear and low cost operation.

Hensley Equipment Co., Inc., 800 Peralta Ave., San Leandro, Calif.

For more details circle 150 on
Enclosed Return Postal Card.

ESSICK

VIBRATING COMPACTORS



ESSICK VR-54TE VIBRATING COMPACTOR TRIPLEX HOOK-UP

100% COMPACTION IN TWO PASSES!

COSTS DOWN—PROFITS UP WITH ESSICK VIBRATING COMPACTORS

John Heckle, General Superintendent for S. Cantor Associates Inc., on the Sayre Woods South Project in Madison Township, New Jersey, says: "we put in borrowed fill on this 2000 unit housing development to meet FHA requirements which called for 95% compaction. A triplex hook-up of Essick VR-54TE Vibrating Compactors was used, pulled by a D-4 tractor with the material being put down in 6 inch lifts. We used two pushers, a dozer, a grader, and 6 caterpillar pans to keep up with the Essick Vibrating Compactors."

OVER 100% COMPACTION was achieved IN TWO PASSES of this work unit, and we compacted approximately 8000 cubic yards of fill per nine hour day in a six day week. This Triplex Unit of Essick VR-54 Vibrating Compactors not only allowed us to cut our costs tremendously, but we completed the compaction phase way ahead of schedule."

ESSICK VIBRATING COMPACTORS ARE CUTTING THOUSANDS OF DOLLARS DAILY FROM CONTRACTORS COSTS! ASK FOR PROOF — SEE YOUR ESSICK DEALER NOW FOR A DEMONSTRATION.



9 Models of Vibrating Compactors from 13" to 72" widths

Tandem Rollers from ½ to 6 Tons

ESSICK MANUFACTURING COMPANY

1950 SANTA FE AVENUE
LOS ANGELES 21, CALIFORNIA

850 WOODRUFF LANE
ELIZABETH, NEW JERSEY

Affiliated with THE T. L. SMITH CO., Milwaukee, Wisconsin

... for more details circle 304 on enclosed return postal card

Chemical Aid to Soil Compaction

A new chemical aid to soil compaction, Kompactor, has been introduced by the Central-Reynolds Co.

Kompactor, though it does not replace compacting methods, is reported to reduce the time needed by heavy compacting equipment to get the job done. It has a wide range of uses for those who use soil as an engineering or construction material. The manufacturer says that it is not a glue or cement. Its electrochemical action takes out of the soil a definite and measurable amount of the material that makes soil difficult or impossible to control. After the treatment, a substantially clean soil particle mass is achieved. When this is done, the ability of the engineer and the contractor to control the soil mass is definitely enhanced. One gallon mixed with 1,000 gal. of water will treat 5,000 to 10,000 sq. ft. A new brochure which describes the action and outlines the method of using it in various applications is now available.

Central-Reynolds Co., P.O. Box 1203, Fresno, Calif.

For more details circle 151 on Enclosed Return Postal Card.

Backhoe Conversion Unit

Standard hydraulic backhoes can be converted into highly productive excavators with the addition of the versatile Kash backhoe bucket, reports Kash Products, Inc.

Open on both ends for digging in



Backhoe Bucket

either direction, the new machine fits all popular tractor makes, the manufacturer reports. It will serve as a backhoe, shovel, mud pawl or sand bucket. The all-welded steel bucket is available in from 12 to 36 in. models. Capacities range from 4 cu. ft. to 1½ cu. yd.

Kash Products, Inc., Huntington Beach, Calif.

For more details circle 152 on Enclosed Return Postal Card.

Aluminum Tapered Poles

The first commercial production of strain hardening aluminum tapered pole products has been announced by the Union Metal Mfg. Co.

Union Metal reports their fabricating process will make available a variety of designs. Applications of the new aluminum pole products include street, highway and off-highway lighting poles; traffic signal poles, and overhead sign supports. The fabricating process utilizes aluminum alloy 5052 sheet or plate, shaped to pre-determined sizes, then pressure-formed and welded into tapered tubes. The tubes are cold rolled on a specially designed tube mill to obtain mechanical properties equivalent to those published for the 5052-H34 temper. The strain hardened aluminum alloy pole is not intended to replace the extruded and spun pole. It is said to expand the usage of aluminum by providing poles of added strength for applications where repetitive loads are encountered.

Union Metal Mfg Co., Canton, Ohio

For more details circle 153 on Enclosed Return Postal Card.

Rubber Expansion Joints

A new rubber expansion joint that provides the same flexibility and more capacity for withstanding high working pressures than standard joints has been introduced to the market by United States Rubber Co.

Known as the AMR (anti-migration rubber) expansion joint because of its unique inner construction, it enables the metal re-enforcing rings to remain stable under pressure. The company reports that the new joints can withstand great temperature changes and high pressure or flow surges. It is reported available in a variety of constructions.

United States Rubber, 1230 Avenue of the Americas, New York 20, N.Y.

For more details circle 154 on Enclosed Return Postal Card.

New Heated Asphalt Lute

The model KL-30 Lute boasts a new concept in the field of material handling in that it has a self-contained heating element which keeps the blade hot to such a degree that it will not



The Model KL-30 Lute

For more details circle 157 on Enclosed Return Postal Card.

retain excess material. The lute is kerosene fired and will operate approximately four hours on one filling.

Constructed of aluminum and steel, the KL-30 is light in weight, leak-proof and the burner and controls are well protected to prevent damage. All parts are replaceable. One of the major advantages of this new lute is the great number of man-hours saved by the elimination of cleaning the tool with solvent, torch or scraper.

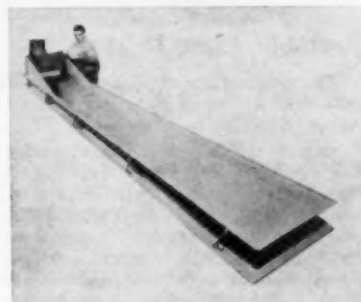
Continental Asphalt Equipment Co., P. O. Box 44, Toledo 14, Ohio.

For more details circle 155 on Enclosed Return Postal Card.

Pneumatic Conveyor Feeder

The new model NF-6-168 pneumatic conveyor feeder has been announced by the National Air Vibrator Co.

The new feeder measures 16 ft. 8 in. in length and has a 4 by 24 in. trough.



Pneumatic Conveyor Feeder

The flow rate can be changed by adjusting the air pressure range from 20 to 70 psi. The device is operated by a Navco BH4 air vibrator that incorporates a one-piece design and a silent type piston as the only moving part.

National Air Vibrator Co., 435 Literary Rd., Cleveland 13, Ohio.

For more details circle 156 on Enclosed Return Postal Card.

Engine Safety Control

A patent has been issued to the Waukesha Motor Co., for a new safety control valve. The device is described as an "overspeed air shutoff valve for internal combustion engine."

Operating on the principle of an over-center positioned lever, the device is spring-loaded to allow the volume of air flow acting on a butterfly to trip or move the butterfly lever past center. The spring closes the valve tightly, shutting off the air supply to the engine. The spring tension and the off-center position of the lever are adjustable to cover normal operating speeds. Normally it is set to trip 100 to 150 rpm above the regular high idle speed since this device is a run-a-way safety device and not a speed control governor.

Waukesha Motor Co., Waukesha, Wis.

Universal Drive Drill Attachment

A new drive that is said to convert any power drill into a variable angle tool which will drill in tight cramped spaces or work around corners has been announced by Glenwood Gyro-Drive, Inc.

The device is reported to fit all mod-



Glenwood's Drill Attachment

els of power drills with $\frac{1}{4}$ or $\frac{1}{2}$ in. capacities and may be permanently installed with a special adapter. The hand grip is removable to facilitate drilling in metal or masonry where extra pressure or control is needed.

Glenwood Gyro-Drive, Inc., Glenwood, Minn.

For more details circle 158 on
Enclosed Return Postal Card.

Rubber Base Sealers

Two new extruded rubber base sealers with a unique cross-sectional 'double donut' design that permits positive sealing of uneven or tapered joints and go deg. bending without the need of cutting and fitting operations are now available from the International Div. of Minnesota Mining and Mfg. Co.

The sealers, designated as EC-2121 and EC-2131 are designed to seal between mating metal surfaces. The sealers act and perform as a rubbery gasket when pressed into a seam and tightened between the sealing surfaces. Because of their unusual cross sectional design the sealers will readily conform and provide an excellent seal around corners without the need for splicing or special fittings. Both sealers have excellent moisture, salt spray and weathering resistance.

Minnesota Mining & Mfg. Co., 900 Bush Ave., St. Paul 6, Minn.

For more details circle 159 on
Enclosed Return Postal Card.

NEWS FROM FLINTKOTE:

SPECIALLY DESIGNED PAVING PRODUCTS

**For sealing joints,
For surface sealcoating,
For concrete bonding,**

ASK FOR FLINTKOTE ENGINEERING DATA SHEETS ON:

M-200: Fast setting, polymer type joint and crack sealer for concrete pavements—cold applied. Offers best resistance to jet aircraft heat and blast operations under wide temperature variations. Meets Interim Fed. Spec. SS-S-00200a.

H-100: Modified polymer type, two-component compound for concrete pavement and structure joints in highway and non-critical airfield areas. Has many advantages over other hot or cold sealers.

FLINTSEAL® (Regular—SS-S-164) and (Jet Fuel Resistant—SS-S-167b): rubber bearing, hot-poured types for durable sealing of joints and cracks to prevent leaking and provide resistance to wear under repeated freeze-thaw cycles. Meet Fed. Spec. for both types.

FLINTAR® (Regular—R-P-00355a) and (Rubberized): Coal tar pitch emulsions for sealcoating and slurry coating bituminous driveways, parking lots, roads, airfield pavements. High resistance to petroleum fuels, oils—extends life of black-top. Meet all specifications.

FLINTCRETE®: Polysulfide/epoxy compounds (grout and binder) for bonding old and new concrete in restoration and repair of pavements and structures, bonding curbs, traffic markers, skid-proofing and many other adhesive requirements. Procedures fully detailed.

*T.M. OF THE FLINTKOTE COMPANY

SEND COUPON BELOW OR WRITE TODAY:

Paving Products Section,
The Flintkote Company,
P.O. Box 157, Whippany, N.Y.

Name _____

Firm _____

Address _____

City _____ Zone _____ State _____

Please send data on _____



America's Broadest Line
of Building Products

... for more details circle 307 on enclosed return postal card

Vertical Exhaust Stack Covers

A new stack cover for vertical exhaust pipes on trucks and other construction equipment has been announced by the Gleason Corp.

Made under the name Weathercap, the new device prevents rain, snow and dust or insects from entering the exhaust stack and causing damage. The automatic device is counterbalanced to



Exhaust Stack Cover

stay closed when the engine is not running. When the engine is in operation, the exhaust pressure opens the stack and keeps it open during operation. When the engine is turned off, the lack of pressure in the stack lets the device fall again. Stacks in sizes from 1 to 6 in. O.D. can be accommodated.

Anthes Div., Gleason Corp., 325 N. Plankinton Ave., Milwaukee 3, Wis.

For more details circle 160 on Enclosed Return Postal Card.

Two-Way Communications

The newest model Aerotron high-performance, low-cost VHF 2-way mobile communications equipment has



Aerotron VHF-FM 2-Way

been announced by the Aeronautical Electronics, Inc.

The new 15 watt mobile radio, set in the Slimline series weighs 8 lb. 10 oz. and stands less than 5 in. high. It is reported to fit under the dash of any car or truck. Slimline sets have an optional provision for a maximum of three transmit and receive channels.

Aeronautical Electronics, Inc., P.O. Box 6527, Raleigh, N.C.

For more details circle 161 on Enclosed Return Postal Card.

I Beam Clamp

A new and patented device, the Chinbro beam clamp has been announced by the Cianbro Mfg. Co.

Designed for quick and safe handling of wide flange beam section in steel and heavy construction industries,



Chinbro Beam Clamp

the clamp, which weighs 110 lb., can lift up to 15 tons. It reportedly can pick up a beam lying either on its flanges or its side. Beams measuring from 7 to 17 in. can be lifted without making adjustments. When the beam is raised, the clamp holds the beam in a three point grip.

Cianbro Mfg. Co., Box D, Pittsfield, Maine.

For more details circle 162 on Enclosed Return Postal Card.

Two-Way Radio

A new portable, transistorized two-way radio is now being marketed by Dorsal Electronics, Inc.



"Walk-N-Talk"

Called "Walk-N-Talk" the system consists of a pair of pocket size 9

transistor transmitter-receiver units designed for two-way communications, operating on the 27 mc band. An AM radio with slide rule tuning is an added feature. The device operates on 6 penlite batteries and comes equipped with telescopic antenna, carrying case and earphone. The maker reports that the radio will communicate from one to 5 miles. Operating on a Class D citizens band, no license to operate is required.

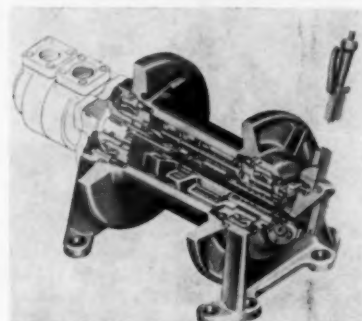
Dorsal Electronics, Inc., 1412 Broadway, New York 18, N.Y.

For more details circle 163 on Enclosed Return Postal Card.

Planetary Winches

A new series of planetary winches has been added to the selection of Carco tractor winches and yarders, according to an announcement by Pacific Car and Foundry Co.

Light weight, compact and versatile, the new winches are specially designed for application where weight



Carco Planetary Winch

and/or space are primary considerations. Available in 4 models, comprising what is known as the "P" series, the new units range in capacity from 10,000 to 90,000 lb. The Carco planetary will accommodate three types of drives—mechanical, electrical or hydraulic.

Pacific Car and Foundry Co., Renton, Wash.

For more details circle 164 on Enclosed Return Postal Card.

Portable Water Coolers

Four new plastic-lined models of portable water coolers have been announced by the Horton Products, Inc. The new models are available in 2, 3, 5 or 10 gal. sizes and can handle either hot or cold liquids.

A galvanized steel, corrugated outer wall is used for the new coolers, with urethane foam insulation, resulting in good insulation and light-weight. Recessed spigot made of plastic is used, lessening breakage and limiting heat transference. The lid is attached to the coolers with a retainer rope which in turn attaches to the carrying handle.

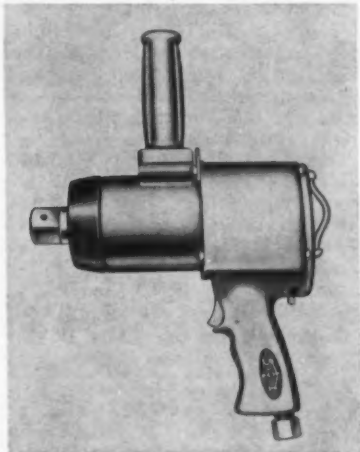
Horton Products, Inc., P.O. Box 7156, Memphis 18, Tenn.

For more details circle 165 on Enclosed Return Postal Card.

Air Impact Wrench

A new Sioux heavy duty, 1 in. sq. drive # 482 air impact wrench was recently announced by Albertson & Co., Inc.

Air entry is through a 1/2 in. inlet. The streamlined housing assures free air flow with minimum restriction. With more air moving at higher speeds the wrench accelerates rapidly for faster rundown. The reversing valve with related volume control for right hand operation is leakproof and well protected. Bails provide for horizontal or vertical suspension. An auxilia-



Albertson's Impact Wrench

ry and adjustable handle can be moved to four positions.

Albertson & Co., Inc., Sioux City 2, Iowa.

For more details circle 166 on Enclosed Return Postal Card.

Three New Backhoes

Three completely new Parson-Shawnee backhoes for utility tractors have been announced by the Parsons Co., Newton, Iowa.

The three models include the 1000, with a digging capacity of 10 ft., the 12 ft. model 1200, and the 13 ft. Model



Parsons-Shawnee Model 1300

1300. These machines feature "Hydaway" hydraulics with cylinders, pistons and hoses enclosed and protected. Three-position dig-all bucket, non-skid

stabilizers, chain drive on swing, safety locks on both boom and swing are also featured. Each of the three new models are reported to fit all popular makes of utility tractors.

Parsons Co., Shawnee Dept., Newton, Iowa

For more details circle 167 on Enclosed Return Postal Card.

Dutch Sealant

A compressible waterproofing sealant, Compriband, developed in Holland and having unique properties of importance for any type of construction joint, is now available in the United States through Pacific Sealants.

Compriband is being used extensively throughout Europe as a joint sealer in buildings for bridges and roads, airfields, tunnels, dams, and reservoirs. Under compression, the original cellular structure of Compriband becomes completely water tight and bonds to contracting surfaces. The material has permanent resiliency and recovery to make it constantly strive toward its original shape and size, even under concentrated and prolonged loads. When all pressure is released, Compriband will return to its original size and shape.

Pacific Sealants, 1491 Daisy Ave., Long Beach 13, Calif.

For more details circle 168 on Enclosed Return Postal Card.

DON'T THROW AWAY CRACKED DIESEL CYLINDER HEADS

You can save 50% of replacement cost with Factory Rebuilt Swick-Guth Heads. Swick-Guth restores cracked or worn heads, blocks, transmission cases to a Guaranteed good as new condition by the Controlled Heat Process . . . successfully used for more than a Quarter Century.

GUARANTEED TO YOUR SATISFACTION



Send today for price list and a free booklet on the famous Swick-Guth Process, and the name of the dealer nearest you.

SWICK-GUTH CO.

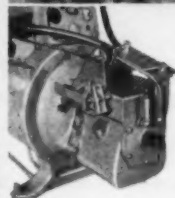
MCMERSON KANSAS • FORMERLY GUTH CO.

"SPECIALISTS IN WELDING"

"DIESEL CASTINGS"

... for more details circle 345 on enclosed return postal card

FUNK LICKED THIS 3-WAY PROBLEM



On this Massey-Ferguson Work Bull Multi-Purpose Loader, a FUNK Revers-O-Matic Drive permits triple operation with two foot pedals. Speed and direction are changed instantly and smoothly, hands are left free for other operations and neutral speed control is provided.

The FUNK torque converter automatically adjusts power between speed and load requirements.

It makes good sense to look for FUNK Modular Power Units on the equipment you buy.

FUNK MFG. CO.

Box 577-H
Coffeyville, Kansas

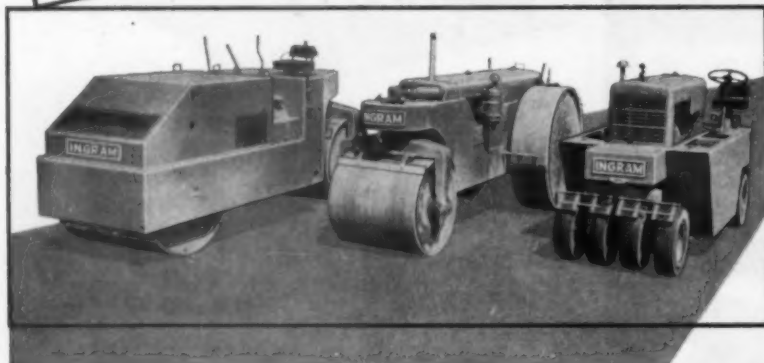
... for more details circle 312 on enclosed return postal card



Floating through axle deep beach sand, this new Oshkosh concrete carrier is equipped with Harro flotation tires to make deliveries without bogging down. These flotation tires are now supplied as original equipment on all Oshkosh concrete carriers. The single tires, which replace dual pairs on rear axles, provide larger footprint, softer ride, reports the manufacturer.

**FOR
RENT**

It's Easy To Rent AN INGRAM



Tandem

3-Wheel

Pneumatic-Tired

It's easy and practical to rent an Ingram Roller. Your Ingram Roller distributor makes it easy to rent an Ingram by cutting red tape. No delays.

You can rent an Ingram by the day, week or month.

You'll find the right type and sized Ingram to fit any compaction job.

Be practical... call your near-by Ingram Roller distributor and see how easy it is to rent an Ingram.

You'll save time and money.

Acme IRON WORKS

P.O. BOX 2020 • SAN ANTONIO 6, TEXAS

Rota-Screw Compressor

A reportedly new concept in portable air compressors has been developed and produced by the Gardner-Denver Co. The device is a portable screw type air compressor which they call the Rota-Screw compressor.

The Rota-Screw is replacing the company's present production of its popular vane type rotary portable compressors which have been successful in the 125 CFM to 900 CFM line. Air entering the intake port is drawn into space between lobes of two helical rotors. The revolving rotors force the air into successively smaller interlobal spaces, compressing the air in a single stage until full compression is reached. As air is expelled, the next groove comes into line with the outlet port to assure smooth free flowing air.

Three models are initially available. The 900 CFM and 600 CFM are powered by newly designed, 6 cylinder Caterpillar diesel engines, and the 125 CFM size is powered by a 6 cylinder Continental gasoline engine. Operating pressure of all models is 100 PSI at 1800 RPM.

Gardner-Denver Co., Quincy, Ill.

For more details circle 169 on
Enclosed Return Postal Card.

Compact Two-Way Radios

A new 50 watt power output Transcom 2-way mobile radio for use in the 25-54 megacycle band has been announced by the Mobile Communications Dept. of Allen B. DuMont Laboratories.

Designated the Type 125-A, it is available in four different versions to meet power and range requirements of the user. All four units are compact for under-the-dash mounting. Each contains a special 3 by 5 in. integrated speaker with the audio directed towards the driver. Handcrafted wiring is featured throughout the units. Such features as dual frequency and coded squelch are optional. All units have only two basic controls.

Mobile Communications Dept., Allen B. DuMont Laboratories, Div. of Fairchild Corp., Clifton, N.J.

For more details circle 170 on
Enclosed Return Postal Card.

ROTARY SWEEPER BROOMS

WE MANUFACTURE

- Austin - Western
- Bob Low Bay
- Bob-McVicker
- Fordson
- Ferguson
- Green
- Guttersnipe
- Hough
- Huber
- Jeep-Willys
- Littleford
- Little Giants



- Malt (M.B.)
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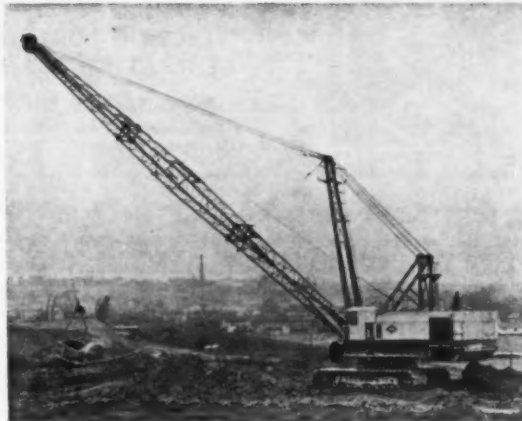
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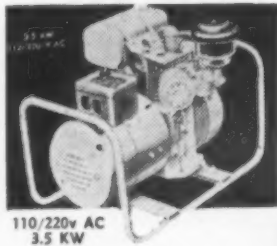
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All units recently reconditioned and guaranteed to be in A-1 Condition.

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- 1—Statewide Hauling Permit—LC Number.
- 1—Lippmann Self-propelled Crusher, 12x36 jaw, 20x30 rolls, 4x12 triple deck screen, completely reconditioned, with extra roll shaft and shell.
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You can purchase any one of the above separately or any combination together. Must sacrifice.

Inquire at

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Eagle Hammermill in good condition. Many extra new liners, hammers & bars, size 12"x24" 75 H.P. Electric Motor \$2,750.00.

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5-GMC City Line Coaches w/6-71 diesels. Will sell complete less tires or will sell engines and accessories separate.

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- 1960—TD24 Ripper Model GR Backhoe Attachment 40' Crane Boom
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- 1959—International Tractor
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- 1954—Trojan Loadster
- 1956—Trojan Loadster (2)
- 1953—Trojan Loadster
- 1958—Model 2460 Gradall
- 1958—TD-18 Int. Crawler Tractor
- 1958—American Model 795C Crawler
- 1959—Galion Tandem Grader
- 1959—Buffalo Springfield Roller
- 1958—D8 Caterpillar Tractor
- 1958—Model 750C American Shovel
- 1959—International Tractor
- 1953—Ingersoll Rand Compressor
- 1953—International Crawler Tractor
- 1953—International Angledozer
- 1955—McKiernan Terry Pilehammer
- 1953—American Model 375 Crawler
- 1959—International Tractor, TD-24
- 1959—Vibro Tamper
- 1955—Drive Welder
- 1959—T75 International Scrapers (4)
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D7 Caterpillar & 75 Dozer with Oil Clutch.
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Oliver 995 with Be-Go Hyd. 6 1/2 yd. scraper. Model 360 15 yd. Allis-Chalmers Scraper.

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1. R. AIR COMPRESSOR, 185 CFM, 1000 PSI, 60 HP—\$800.
ALDRICH PUMPS, 500 gals./min. at 1200 PSI.
400 HP MOTORS, 700 RPM, 3/60/440—\$1800.
NEW METALLIZING SETS, with Regulators, Benderizer, 200g wire—\$375.
B-BLASTING MACHINES, 10 Cap Size, \$55 each.

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15" x 24" Jaw Crusher Primary, Feeder, Inter. Diesel Engine
24" x 16" Rolls, Secondary, Vib. Screen, 3 Conveyors & Engine
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ATHEY WAGON (L.H. Side Dump)

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Ford Diesel Tractor S/N 81344 Model 1811-D purchased September 1959 and used one job only. Equipped with Hydraulic Front-End Loader S/N 3948 and Hydraulic Backhoe S/N 1348. Select-O-Matic Transmission with latest Factory conversion kit installed March 1961 by Ford technician. Excellent condition; LaTourneau "D" Pulls S/N's GP-6023SD-P-A, GP-60228-DP-A, GT-8144, GP-61543-DP-Q, good condition, one with 90 working-day warranty on engine; Gallion Motor Patrol S/N GMD-21543; Northwest Model 25 Crane with GMC 3057 engine, 50' boom, 24" tracks; Bucyrus-Erie Model 22-B with both 45' boom and backhoe; Ottawa Hydra-Hammer S/N 807M6. Kubit Rock Crusher Model 3—Serial #1159. Can be seen and demonstrated at Central States Shop 4 miles east of New London, Minnesota on TH 23 or contact:

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FOR SALE

Hough Model HMC Payloader s/n 92578C
—with Hercules Engine, Cab, 14.00 x 24 tires, torque converter and 2nd bucket—Machine completely reconditioned—Priced right.

IRELAND MACHINERY CO., INC.

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JU 7-2770

PROJECT QUALITY CONTROL

Continued from page 131

ciency in density in the base course should be detected during this operation and the condition corrected. Special care must be exercised to adequately and accurately finish the base surface immediately below the bituminous concrete. One of the fallacies of asphaltic concrete pavement construction is that the paving machine, in its present state of development, will take out the humps and hollows. This is not true and it should be pointed out that an attempt along these lines will result in pavement thicknesses outside of tolerance limits.

It cannot be stressed too strongly that the riding characteristics of the pavement will truly reflect the shape of the binder course prior to the placing of the pavement. The inspection necessary to oversee the paving operation should be of the very highest type.

Record Sampling

Now we come to the part which

I wish to term the "moment of truth". This is the record sampling, necessary to conclusively prove that the project has been built in accordance with the contract specifications. A regular program of record sampling has been required by the Bureau of Public Roads. Such sampling is good business. It provides assurance that proper thicknesses of the component layers of the pavement structure and sub-structure are in place, are of the specified density, and that the material meets the quality requirements of the specifications.

Actually, while this record sampling has been imposed upon us by the Bureau, I believe that we should welcome such a program. I am sure that most states, even prior to the inception of a record sampling program, made these determinations on a more informal basis for their own use.

For record sampling to be truly meaningful on Federal-aid jobs, it must be carried on in cooperation with the Bureau of Public Roads actively participating. In all cases, BPR officials should be notified,

that they may be present and view the operation and designate the location for the sampling if they so desire. If good project procedures have been followed, no deficiencies will be found. If any do occur, then an immediate examination of construction practices should follow and the necessary steps taken to bring the troublesome item under control.

Highway construction people, whether employed by the contractor or by the engineering forces, have built up a reputation over the years as being honest, conscientious, dedicated individuals. Any system of checks or balances should be designed to preserve this integrity. Serious thought should be given prior to making changes in procedures which have proven prudent through many years. Care should be taken to avoid multiplicity of forms, unfortunate or ambiguous language in specifications, non-uniformity of practices, and lack of faith in construction personnel to the end that resentments, ill-will, and indolence will not occur.

Manufacturers' Literature

DRAGLINE BUCKETS: A new brochure covering the Page Automatics in 4 to 7 cu. yd. range has been issued by the Page Engineering Co., Clearing Post Office, Chicago 38, Ill.

The two-color, four page bulletin describes in complete detail and illustrates the many outstanding features found in the Automatic. The machine is recommended for use in either general purpose where a variety of jobs are encountered or in heavy duty work where blasting in materials like hardpan or shale is necessary.

For more details circle 171 on Enclosed Return Postal Card.

WHEEL EXCAVATOR: A new broad-side covering the Model 2000 wheel excavator has been issued by Baldwin-Lima-Hamilton Corp., Construction Equip. Div., Box L, Lima, Ohio.

The four color sheet discusses and explains the uses of the new machine.

For more details circle 172 on Enclosed Return Postal Card.

BUCKET ELEVATOR SYSTEMS: A new 84-pg. manual that is designed to simplify the selection and application of bucket elevator systems for bulk handling of such material as chemical, chips, coal, ore and sand has been released by Webster Mfg. Inc., Tiffin, Ohio.

The booklet illustrates a wide selection of basic bucket-elevator types . . . centrifugal discharge, perfect discharge, gravity discharge and pivoted-bucket carriers. A spread on the basic fundamentals to be considered in selecting the right bucket elevator for a given handling problem lists 8 factors which must be taken into account.

For more details circle 173 on Enclosed Return Postal Card.

FORK TRUCKS: Complete specifications on some of the world's largest general purpose fork trucks are given in an 8 pg. bulletin published by the Industrial Truck Div. of Clark Equipment Co., Battle Creek, Mich.

The two trucks described, the Ranger 600 and 700, have capacities of 60,000 and 70,000 lb. at 48 in. load centers and are designed for heavy lifting work at steel yards and similar outdoor operations. Given are details on speed, grades and underclearances; engine and electrical system; power train brake and operator's controls.

For more details circle 174 on Enclosed Return Postal Card.

SELF-PROPELLED MIXERS: The single pass mixing efficiency is reported doubled in American-Marietta's self-propelled Trav-L-Plant and Pulvi-Mixer, states a new literature piece from

American-Marietta, Construction Equip. Div., Milwaukee 1, Wis.

This machine can travel at a lower speed—50 percent slower—due to a new transmission. They can now travel at 1/2 mph., as contrasted with 1 mph., in recent models. The company says that by cutting the rate of forward travel while maintaining a constant rotor revolution, the mixing action per lineal foot of travel has been doubled.

For more details circle 175 on Enclosed Return Postal Card.

EMERGENCY LIGHTING CATALOG: A new 8 pg. catalog dealing with Light Warden emergency lighting equipment is available from the Electric Cord Co., 432 Plane St., Newark, N.J.

The booklet provides operating data and prices on the line of fully automatic, battery operated emergency lighting fixtures. Designed to operate instantly in the event of electric power failure, the Light Warden is fully guaranteed, states the manufacturer, for 5 years.

For more details circle 176 on Enclosed Return Postal Card.

ICE CONTROL MOVIE: "Clear Roads Ahead", a 35 mm color filmstrip with sound, has been produced by the International Salt Co., Clarks Summit, Pa.

The 8 min. film illustrates the use of straight Sterling Auger-Action rock salt to obtain open roads and safe driving conditions on streets and highways throughout the winter. The film also illustrates alternate methods of ice control.

For more details circle 177 on Enclosed Return Postal Card.

PORTABLE IMPACT COMPACTOR: A new pamphlet, available from Racine Hydraulics & Machinery Inc., 2000 Albert St., Racine, Wis., describes the functions and specifications of "Rap-ak", a new portable impact compactor.

This one-man compactor is widely useable in the construction and earth moving industries, offering outstanding output.

For more details circle 178 on Enclosed Return Postal Card.

AQUAMETERS: A new descriptive bulletin on two Beckman Aquameters is available from the Scientific and Process Instruments Div. of Beckman Instruments Inc., Fullerton, Calif.

The new instruments, models KF-2 and KF-3, are said to be simple to operate and provide a rapid, accurate and convenient means for determining the moisture content of samples.

For more details circle 179 on Enclosed Return Postal Card.



MULTIROLL FILES

IDEAL FOR... PLAT PLANS PROJECT PLANTS

File constructed in 200 lbs. test corrugated container.

9 TUBE MODEL Tube I.D. 4 1/8"			
MODEL NUMBER	0930	0936	0942
Size	13 1/2 x 13 1/2 x L	31	37
Inside depth	30 1/2	36 1/2	42 1/2
Price	\$11.50	\$12.00	\$12.50

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MODEL NUMBER	1630	1636	1642
Size	13 1/2 x 13 1/2 x L	31	37
Inside depth	30 1/2	36 1/2	42 1/2
Price	\$12.00	\$12.50	\$13.00

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SOLD DIRECT ONLY
25 and 49 Tube model avail. Write for brochure.

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... for more details circle 342 on enclosed return postal card



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Everything to see and do! Visit Museum of Science and Industry . . . Lincoln Park Zoo . . . Radio & TV Studios. Enjoy miles of beaches . . . parks . . . boat rides . . . indoor and outdoor concerts . . . baseball at its best — Cubs & White Sox.

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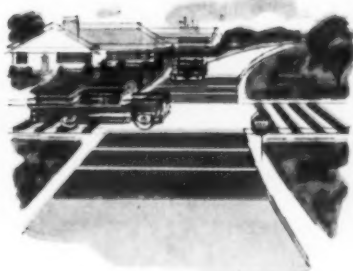
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NEW DESIGN OPPORTUNITIES: Driveways, tennis courts, patios, pools and parking lots can now be surfaced in pleasing colors.



TRAFFIC SAFETY: Curbs, crosswalks, centerlines, speed zones and turn-offs can be permanently indicated in color.



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Viadon and Miradon, developed by Esso Research, bring you *permanently* colored paving in red, green, blue, yellow-gold and white. The color is built in—it cannot wear off. Miradon is especially recommended where high resistance to fuels and oils is needed, such as service stations and airport landing strips, loading zones and parking areas.

These remarkable new materials can be mixed in

standard asphalt pugmills and laid with existing equipment. They will not set permanently in transit; can be softened by heat if desired. No special storage facilities are needed.

For more facts about this designer's dream-come-true, or for technical assistance in applying Viadon and Miradon, write us at 15 West 51st Street, New York 19, New York.

*Trademarks

**ESSO STANDARD, DIVISION OF
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How Cedarapids paver turns rough road into easy street

This electrically controlled Cedarapids paver can turn any rough road into a smooth bituminous surface at speeds up to 102 ft. per minute. The steering of the paver imposes heavy thrust loads on the crawler track bearings. To take this punishment and keep it paving without delay, its builder—Iowa Manufacturing Company—specified Timken® tapered roller bearings for the track drive sprockets and track takeup idlers.

Timken bearings solve load problems because their tapered construction lets them take any combination of radial and thrust loads. They keep sprockets on track assemblies properly aligned. Because of their separable components, Timken bearings make assembly easier and more economical. And they make sealing more effective in keeping lubricant in, dirt out. Performance stays up, maintenance down. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

... for more details circle 347 on enclosed return postal card

Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits. Canadian Division: Canadian Timken, St. Thomas, Ontario.



TO HELP SOLVE CUSTOMER BEARING PROBLEMS we use advanced testing equipment in our modern laboratories. It not only serves customers, but furthers our program of improving Timken bearings.

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TIMKEN®
tapered roller bearings



